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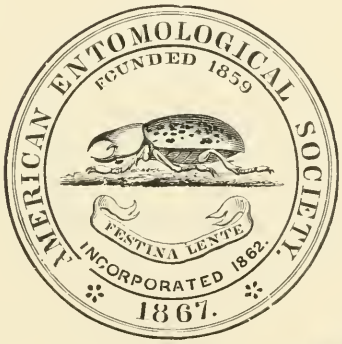

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LIST OF PAPERS.

PAGE

ASHMEAD, WILLIAM H.
Classification of the Bees, or the Superfamily Apoidea. 49

BANKS, NATHAN.
New genera and species of Nearctic Neuropteroid Insects 239

BASSETT, H F.
New species of North American Cynipidæ . . . 310

FALL, H. C.
Revision of the Lathridiidæ of Boreal America . . 101

HAYWARD, ROLAND.
A Study of the species of *Tachys* of Boreal America . 191

HUNTER, W. D.
A Catalogue of the Diptera of South America, Part I, Bibliography and Nemocera 260

SKINNER, HENRY, M.D.
Revision of the American species of the genus *Cœnonympha* 299

SMITH, JOHN B.
Contributions towards a Monograph of the Noctuidæ of Boreal America—Revision of the genus *Hydræcia* Gn. 1

TRANSACTIONS

OF THE

AMERICAN ENTOMOLOGICAL SOCIETY.

VOLUME XXVI.

CONTRIBUTIONS TOWARD A MONOGRAPH OF THE NOCTUIDÆ OF BOREAL NORTH AMERICA.

REVISION OF THE GENUS HYDRŒCIA Gn.

BY JOHN B. SMITH, SC. D.

Hydræcia was first used by Gueneé in 1857, in his Essay on the Classification of the Noctuidæ, and was applied in a more extended way in the Species General, in 1852. In the latter publication *micacea* was designated as the generic type, and in this sense Lederer defined it more accurately in 1857. Later European writers have in general followed this precedent, and after some shiftings between *Apamea* and *Gortyna*, Mr. Grote finally followed their example for our American species.

Gortyna was proposed by Ochsenheimer in 1816, but not very sharply limited, the type being the European *flavago*. Hübner at about the same time used *Ochria* for the same species, and Mr. Grote for a time used this term for some of our American forms, which he considered congeneric with the European species.

Gueneé used the term *Gortyna* for the type species of *Ochria* and for a number of others, among them several Americans—and he was followed by Walker.

Lederer pointed out the difference in clypeal structure between *Hydræcia* Gn. and *Gortyna* Ochs., and sharply defined the two genera.

Omitting the matter specifically, referring to the European species, Lederer's characterization is as follows:

Moderate, plump species, the primaries also sharp pointed, the

secondaries somewhat produced at the apex and a little retracted between veins 4 and 6. Front and palpi with short woolly vestiture, the latter hiding the obtuse little terminal joint of the palpus. Thorax convex, with a sharp crest behind the collar and a truncated tuft posteriorly. Abdomen plump, in the male truncate at tip, in the female pointed; without tufts or with only a few divergent hairs on the first segment. Tongue spiral. Eyes naked. Antennæ thick, in the male with brush-like ciliæ and either smooth or with pyramidal teeth. Legs short and thick. Front without projections or similar modifications.

Strictly construed this definition excludes more than half of our species, which are yet not referable to *Gortyna* because of the unarmed front.

The truth is, Mr. Grote realized that there were two divisions without quite hitting the essential difference between them.

What may be called the first section contains species which agree with the characters above given by Lederer and of which *atlantica* and *immanis* of our fauna may be considered representatives.

The second section, for which the term *Papaipema* is proposed, consists of those species with broader primaries, the apex acute, the outer margin a little excavated below it and then bulging out at the middle. The male antennæ are simple and the anterior thoracic tuft is broad, transversely flattened, very prominent and usually a little notched centrally. It resembles in appearance an adze set up just behind the collar. Accompanying these points of difference is a very decided peculiarity of the male gentalia, for, while in *Hydræcia* proper there is nothing especially characteristic, nearly all the species of *Papaipema* have the harpes more or less forked and with a triangular patch of spinulated surface at the tip. The clasper is in almost all cases a long, stout, curved hook; but is unique in having the outer curve strongly toothed. This character is so unusual and so constant that it becomes important, especially in combination with the superficial peculiarities already mentioned.

The section *Hydræcia*, as represented in our fauna, is not particularly compact, and is easily divisible into sections containing from one to three species.

Albilunata and *v-album* differ from all the other species by the obtuse and rather short, broad primaries, which, as the species are compactly built, give them a heavier appearance than usual. The anterior thoracic tuft is somewhat loose and rather divided than

crested. *Albilunata* is a pale, reddish luteous species from the West, in which the reniform is a slender white lunule. The median lines are even, slender and whitish.

V-album is an eastern and southern species, of a rich, deep wine red or brown, the median lines slender, irregular and brown, and the reniform outlined inferiorly in white, so as to form a **V** or **U**, from which the name is derived. These two species have nothing in common except the general wing-form and build, and in the structure of the male genitalia they differ entirely.

In *albilunata* there is an oblique, broad harpe fringed at the tip by a row of spinules. There are two claspers; one of them toward the base very strongly curved, so as to form almost a semicircle; the other much longer, stouter, only a little curved and reaching almost to the end of the harpe. There is nothing inconsistent with the general tend of genital structure in this. In *u-album* the harpes are very broad at the base, forming almost a square plate, which abruptly narrows to half its width and terminates in a drawnout inferior angle. The clasper is a very broad, short process, narrowing rapidly to an acute tip, situated at the point where the harpe is suddenly narrowed. None other of the species in this series has a similar structure.

Velata forms a section by itself, with its narrow, pointed primaries, which have the outer margin distinctly scalloped. In color it is a deep, smoky brown, somewhat mottled, and the ordinary spots are narrowly outlined by pale scales—a unique character in the genus, by which this species may be at all times recognized. The male genitalia are hadeniform in type, the harpes rather abruptly bent, the tip somewhat broadened and fringed with spinules. There is a slender, straight, pointed process at about the middle; but the main clasper is a large, stout, blunt corneous hook, which is only a little curved and twisted and reaches beyond the tip of the harpes.

Three species, which have in the past been considered as identical with the European *nictitans*, agree in trigonate pointed primaries, which are in general a shade of brick-red and in which the outer margin is even. In general maculation all are alike, having all the usual lines and spots, and none of them strongly contrasting. The lines are a deeper shade of red brown and the t. p. is geminate; the inner portion crenulate or lunate, the outer even. The ordinary spots may be yellow, white or concolorous within the limits of the same species; but there are no other white shadings.

In the common eastern species there is no one prominent feature, and the secondaries are reddish or smoky. This, from its general locality, I have called *atlantica;* but as a matter of fact it extends to the Rocky Mountains in Colorado. This is the species which most resembles the European *nictitans,* but the sexual pieces of the male differ completely.

Pacifica is so called from the fact that all of the examples seen by me comes from the Western Coast States, ranging from California to Vancouver. It seems to be less common than its eastern ally and is a little more brightly shaded. None of the examples seen by me have the ordinary spots white; but all of them have the angulated median shade well marked or even prominent. The secondaries are yellowish or purplish red and somewhat silky, quite different from the eastern examples. Finally, the primaries are somewhat shorter and broader, giving the species a stouter, chunkier appearance.

Interoceanica occurs, so far, only in the region about Winnipeg, Manitoba, but will probably be found north and west of that point. It may also extend southward into the United States; but I have no material from the border States. In wing form this is more like *nictitans,* but in color it is much darker, the secondaries being almost blackish. In the specimens before me the reniform is white; but this may not be a uniform character.

These three species I would hardly have dared to separate from *nictitans* had it not been for the differences in structure in the male genitalia; but these are so radical that specific identity is out of the question.

In the European *nictitans* the harpes are bent at the middle, forming a long trigonate tip, which is partly fringed and partly set with spines. There are two clasper-like corneous processes, but so irregular that verbal description is difficult. Reference should be had to pl. 1, fig. 7.

Atlantica has the harpes almost even throughout and only a little curved at the middle; the tip is rounded and fringed with spines, except at the inferior angles, while some distance within the tip is a triangular patch of densely set spines, which is found in no other species. The clasper is a very long, curved and somewhat twisted hook, which arises from a chitinous ridge within the middle.

Pacifica has the harpes decidedly shorter and more abruptly bent, forming a triangular tip that is elevated above the usual portion. The upper half of the tip is fringed with spinules. The clasper

arises from the depressed basal portion, is abruptly bent and tapers to a long acute tip, extending somewhat beyond the lower angle of the tip of the harpes.

Interoceanica has moderately curved, rather narrow harpes, which are dilated to form a broad curved tip, in which the lower angle is acute and the upper is obtusely cut. The tip is fringed with spines for its full extent, and there is a triangular patch extending in from the lower angle which is also densely spinulated. The clasper is a very short, slightly curved, stout, cylindrical claw, with an obtusely truncated tip. It will be seen, therefore, that there is no lack of structural characters to separate all these species, however much they may be superficially alike.

Juvenilis is a smaller species than those just described and with even narrower wings. In color it is a rather bright clay yellow, with all the usual markings evident. The median lines are single, the t. p. crenulated and not followed by an even outer shade. The median shade line is angulated and very distinct. The size and color easily mark the species, and the sexual structure is equally distinctive. The harpes are moderate in width, a broad, rather obtuse process being sent out inferiorly. The tip is not specially modified and has only a few longer, stiff hairs. There are two claspers: one of them arises near to the middle, is broad at base, semi-cylindrical and tapers to an acute point. It is only a little curved and extends more than half-way to the tip. The other is much shorter, but more curved, cylindrical, stout, rather obtusely tipped and arises close to the tip of the harpes.

Immanis, *stramentosa* and *obliqua* differ from all the preceding by the presence of a pale shade following the t. p. line. The latter is single or, if the outer portion is indicated, the pale shade forms the included space. Besides this pale shade there is no prominent maculation, though all the lines and spots are outlined; but there is a tendency to darken the median space. The European *micacea* belongs in this series, and our American representative is *immanis*, which is larger though otherwise closely resembling its foreign ally.

Immanis is the largest species in this series and it shows the least contrasts. In color it is a dull earthy brown, hardly darker in the median space, and with the t. p. line about parallel with the outer margin. The harpes of the male are very broad at base, abruptly bent above and narrowed from below toward a somewhat lappet-like tip, which has a rather sparse fringe of spinules. There is a

long, curved, semicylindrical clasper with regular edges, starting near the middle of the upper margin and curved so as to reach the inferior angle of the tip of the harpe. Two small, supplementary claspers arise nearer the inferior margin, beyond the origin of the larger structure.

Stramentosa is almost as large, with essentially the same markings, but entirely different coloring. The ground is a pale clay yellow, the costal region shaded with reddish to the t. p. line, while the other shadings, especially the outer third of the median space, are distinctly olivaceous. The insect reminds me strongly of a *Cosmia*. In a general way the male characters resemble those of *immanis*, but the bent part of the harpe is much narrower, the tip much smaller, with rounded angles, while the single clasper is much stouter basally and has even edges.

Obliqua is distinctly smaller, the median space is always darker than the rest of the wing, and sets off the very oblique t. p. line and its accompanying whitish shade. The outer margin of the primaries is also more oblique than in the preceding, though not so much as the t. p. line. The harpes in the male are much as in *immanis*, but the tip is decidedly broader. There are two small, corneous claspers, of which that nearest to base is beak-like, and that nearer to the tip is cylindrical, pointed and twisted.

Medialis intensifies the contrasts of the preceding species; but the male antennæ are distinctly bristle tufted, the joints serrated. The ordinary markings are much less defined; but essentially as in *obliqua*. The harpes in the male narrow abruptly from below to form a triangular tip, which ends almost squarely, and is fringed with spinules, except at the lower angle. There is a beak-like clasper with a broad base at the narrowest part; its point extending to the end of the inferior angle of the tip of the harpe. Another small, obtuse, cylindrical process arises nearer to the middle.

Palleseens is yet more contrasting, but with a wash of white over the whole primary, which gives a peculiar dead shade to the coloring. The male antennæ are decidedly more strongly serrated, and the bristle tufting is more obvious than in the preceding species. The genitalia are much like those of *medialis*, but the clasper arises near the middle of the harpes and extends to the lower angle of the tip. It is very broad at base, semicylindrical and with regular edges. A small, cylindrical, somewhat club-shaped process arises within the cavity at the base of the main clasper.

Senilis resembles the last preceding two species in the serrated and bristle-tufted antennæ; but in little else. The ground color is a peculiar, dull, rusty brown, on which the slightly darker lines trace out the usual maculation. In all essentials we have the maculation of *nictitans* (*atlantica*) with the color of *Pachnobia littoralis*, for which this species might be at first mistaken. The harpes of the only male before me are broken at the tip, but the main clasper is large, semicylindrical, very broad at base and tapering to an acute tip; the margins irregular. At the base of this is a small, pointed, beak-like process.

Serrata differs from all its allies in the well-pectinated antennæ of the male. It is bright yellowish red-brown in color, with all the ordinary spots white and contrasting. It thus resembles, superficially, the species of the next series; but the wing form is not as described for that, nor does it have the characteristic thoracic tuft. Its antennal structure, combined with the ornamentation, will always identify the species. The male characters resemble in general those of *juvenilis*. The harpes are almost parallel, the tips obtuse and not specially modified. There is a long, stout and slightly curved clasper arising within the middle of the harpe and extending more than half way to its tip, to a point where a second broad, short, obtuse process arises near the lower margin.

The species of *Papaipema* are more closely allied, tho' several of them separate off easily.

It is in this series, and particularly in the species allied to *rutila*, that confusion has occurred in collections. Just what the distinctive characters are no one seemed to know: several names in the lists were not represented by specimens in any collection, and the range of variation was in doubt. It was assumed to be great, because of what was known of *nitela* and *nebris*, and of the forms of *nictitans*. Thus it came that two species were associated under *rutila* and two under *marginidens*. The latter species was often named *limpida*, and this was due to the fact that it was so named in the Graef collection, from which I obtained my first names in the Noctuidæ. The name remained on my examples, from which determinations were made for others, until I saw the type in the British Museum and called attention to the matter in the catalogue. It appears now that our species are much more constant than has been supposed and that there is really very little variation.

Cerina is readily distinguished by its lemon yellow ground color

and brown mottlings, which are scattered basally, but fill almost all beyond the t. p. line. The sexual pieces of the male are not quite like the type of the series; the harpes bend abruptly to form a narrow tip, which is set with hair rather than spinules; but the clasper is as described and set with teeth like a file.

Inquesita and *speciosissima* have the t. p. line geminate and even, both parts being almost equally distinct. The median shade line is rather prominent and distinctly angulated near the middle of the wing. The veins are all dusky and this, with the fact that the angle of the t. p. line is obtuse and formed near the middle of the wing, give the species a characteristic appearance.

Inquesita is rather a small species in which the ordinary spots are rarely white. The reniform is rather feebly marked, the orbicular is round or ovate, and the claviform is of the usual decumbent ovate form.

Speciosissima is much larger—one of the largest in the genus—and in all the specimens I have seen the ordinary spots are white, upright and linear. Even the claviform is of this unusual shape; hence the species should be an easily recognizable one.

Rigida is pale, straw yellow to the t. p. line, beyond which it is purplish brown, except at the apex, which is also yellow. In form of the t. p. line it agrees with *harrisii*.

In six species besides *rigida* the t. p. line on the primaries runs outwardly from its inception on the costa through the costal cell; then bends sharply on the subcostal and runs evenly and obliquely to the hind margin.

Harrisii, *verona* and *purpurifascia* are red or red-brown species. *Nitela*, *nelita* and *uecopina* are mouse-gray.

Harrisii has both parts of the t. p. line present, the inner being even and parallel with the outer, which is not fasciate. The space beyond the t. p. line is strongly shaded with purplish, except at the apex, and this shade sometimes extends over the entire wing. The ordinary spots are usually white.

Verona is a smaller and more brightly colored species with the markings as before, except that only the s. t. space is at all shaded with purplish. The ordinary spots are as before.

Purpurifascia has the inner portion of the t. p. line obsolete or very faint, while the outer is broad, distinct and developed into a real purplish band or fascia. This purplish shade usually extends through the s. t. space and may include the terminal space as well,

leaving only the apex free. The orbicular and claviform are usually white. The reniform is marked by white margining spots which are sometimes absent.

Nitela is the first of the mouse-gray species and is a somewhat variable form. The t. p. line is always distinct, accompanied by a whitish line, beyond which a pale cloud extends a variable distance; but the line itself is not so abruptly bent as in the brown species. In all cases the line is evenly oblique or almost rigid, and in many instances it seems to run directly into the costa; but not infrequently it bends or curves inwardly opposite the upper part of the cell and runs evenly into the costa. The ordinary spots may be present and white marked, or they may be scarcely traceable. The s. t. line is always traceable and sometimes distinctly marked by white scales.

Nelita is closely allied but is smaller, and the t. p. line, which is much less evident, runs outwardly to the inner margin just within the anal angle.

Necopina is larger than the two just mentioned and almost without markings. The t. p. line is barely traceable by a scattering of pale scales, and sometimes traces of the ordinary spots can be seen; but the s t. line is not visible in any example seen by me.

In the remainder of the species the t. p. line may or may not be geminate, but is usually lunulate, crenulate or otherwise irregular: it is curved and bent over the cell and is somewhat drawn in below, never even, as in the preceding series.

Limpida and *cerussata* are very dark, blackish brown species, with white ordinary spots, and join naturally to the dark, mouse-gray species of the preceding series.

Limpida is moderate in size or rather small, and has the reniform quite broad and normally developed. In the male the mark is entirely white, though broken into blotches.

Cerussata is much larger, the reniform longer and narrower, the white spots grouped around a central, narrow, yellow line or crescent. The difference at first sight is not great, and I would not have been inclined to allow so much weight; but at this point the uniformity in male sexual parts is broken in a remarkable way. The harpes here are broad—very small for so large an insect—the tip is obtuse, the upper angle rounded and set with a few short, very stout spines, the lower a very little produced. The clasper is short, very stout, cylindrical, a little curved and with an obtuse tip.

All the other species are yellowish, reddish or brown, and in five of them the ordinary spots are never white marked, so far as the material seen indicates.

Frigida comes from Winnipeg and is a dull, powdery, red-brown form, in which all the markings are more or less obscured. The t. p. line is geminate and more even than usual here, a purplish wash is traceable outwardly, the median shade line is quite distinct, and the reniform is indefined and blackish.

It somewhat resembles an *Orthosia* in appearance and is totally unlike any other of our allied forms. It is unexpectedly quite close to *cerussata* in the sexual parts of the male, differing chiefly in the longer and more slender clasper.

Unimoda is another species which has no marked characteristics. It is a large species, of the same dull, reddish luteous found in *senilis,* and all the markings are written in a somewhat darker shade of the ground color. The t. p. line is lunulate and the s. t. is unusually well defined. The sexual structure of the male is also like that of *cerussata,* save that the clasper is longer, broader at base and more evenly tapering to the tip.

From this point the usual form of sexual structure is again found and there is no marked departure until the last species is reached. Even there the departure is not radical, because the harpes remain as usual. It is odd and to me inexplicable that there should be this break in the continuity of structure, separating as it does two such similar species as *limpida* and *cerussata* and associating such totally different forms as *cerussata, frigida* and *unimoda.*

Angelica is quite brightly reddish brown, without contrasting ornamentation, save that the outer part of the t. p. line is fasciate, purplish and more even in course than usual. The reniform is obscured by a smoky shade in the cell.

Cataphracta is yellow in ground color and powdered with purplish. The basal space is marked with irregular spots, and beyond the t. p. line purplish predominates, except at the apex. The ordinary spots are always outlined, but never white in the large number of examples seen.

Impecuniosa is a small, rusty, red brown, powdery species, in which the apices of the primaries are unusually acute. The median shade is well marked and the s. t. space is well shaded with deeper brown.

In the remaining species the ordinary spots are always white

marked, and the only remaining subdivision is based on the shape of the reniform. In *circumlucens* and *rutila* the mark is normal in form, a little constricted centrally but symmetrical, and of about the same size above and below the constriction. In *appasionata*, *marginidens* and *furcata* the mark is much larger, hardly, if at all, constricted centrally, and the lower half much broader than the upper.

Circumlucens is even, yellow to red-brown in color, without strong contrasts anywhere, and the s. t. space hardly, or not at all, darker than the remainder of the wing.

Rutila is darker and redder, so strongly powdered in many cases as to seem rusty. The t. p. line at least is always well marked, and the s. t. space is always strongly shaded with purplish brown.

Appasionata is easily confused with *rutila* until the reniform is examined; but the size of this and its enlargement inferiorly is characteristic.

Marginidens is paler, more brick-red in color, with the purplish shadings not contrasting. All the markings are well defined, but there is nothing that stands out except the white spots. The darker shadings seem rather to give the wings a soiled appearance.

Furcata is very pale, almost straw yellow in color, with all the marking well written, but without dark shades or contrasts. The white spots are very large, the reniform broader than any other species, but the central portion is concolorous, the surrounding group of spots relieving this very prettily. In this species the clasper departs from the usual type and is forked at the tip. The upper process is irregular and forms a continuation of the basal portion; the lower process is much longer, slender, cylindrical and curved to form almost a semicircle.

The only species not known to me autoptically is *erepta* Grote, described from Kansas. I have no material from that State and have no sufficient recollection of the type to enable me to place it. The species is well enough described, however, to be recognized, provided it is an *Hydræcia* at all.

Our knowledge of the early stages of the species of this genus leaves much to be desired. Few of them, comparatively, are known at all, and others are only imperfectly described. In a general way they may be said to be borers, either in roots or stems and they have the usual appearance of species with such habits.

Mr. Henry Bird, of Rye, N. Y., has in recent years made a study

of the larval habits of several of our species, and his interesting paper is found in the Canadian Entomologist, xxx, 126, for May, 1898. The study of this branch of the subject may be safely left in his hands.

For the gift and loan of material in this genus I owe thanks to Dr. L. O. Howard, Curator of the Department of Insects in the U. S. National Museum, Prof. J. H. Comstock, Prof. S. A. Forbes, the late Dr. J. A. Lintner, Dr. R. Ottolengui, Dr. William Barnes, Dr. Roland Thaxter, Mrs. C. H. Fernald and the Messrs. Graef, Doll, Bird, Goodhue, Hanham, Moffat and others of my correspondents who responded liberally to my requests.

It is to be regretted that I could not include the species of *Gortyna* proper in this study; but I have found it simply impossible to get any material whatever of either species.

In tabular form the species may be arranged as follows:

Table of the species of Hydræcia.

1. Thorax with a loose tuft or small crest anteriorly; the latter sometimes a little divided, but never prominent nor transversely flattened; primaries as a rule moderate in width or narrow, trigonate; antennæ various. **hydræcia** 2.

   Thorax with a prominent, high anterior tuft, which is transversely flattened and a little divided centrally—somewhat resembling the blade of an adze; primaries broad, large, a little excavated below the apex; antennæ of male simple..... **papaipema** 14.

2. Primaries short, broad, stumpy..... 3.

   Primaries longer, trigonate, broadening regularly from base..... 4.

3. Pale reddish luteous, with a slender, white lunule forming the reniform. **albilunata.**

   Deep, rich, purplish brown, the lower half of reniform outlined in white so as to form a small U..... **u-album.**

4. Antennæ of male simple..... 5.

   Antennæ of male with the segments marked and bristle-tufted..... 10.

   Antennæ distinctly pectinated..... 13.

5. Deep, somewhat smoky and mottled brown, ordinary spots narrowly outlined by white scales, fringes a little excavated on the primaries.... **velata.**

   Lighter brown or reddish, ordinary spots never ringed with white scales, though the spots themselves may be white; fringes of primaries even.. 6.

6. T. p. line geminate, inner line crenulate or lunate, outer even, not followed by a pale shade..... 7.

   T. p. line single, crenulate, the outer even line wanting, not followed by a pale shade..... 8.

   T. p. line even, single, followed by a pale or whitish shade, or if geminate the included space is prominently pale..... 9.

7. Dark red-brown; reniform white; secondaries almost blackish. **interoceanica.**

Rather dark brick red; reniform white, concolorous or yellowish; secondaries reddish or smoky.....**atlantica.**

Pale brick red, reniform yellowish; secondaries yellowish or purplish red. **pacifica.**

8. Reddish luteous, pale; all the lines obvious; median shade prominent, angulate.....**juvenilis.**

9. Large, dull brown, broad winged; median space scarcely darker; t. p. line parallel with outer margin.....**immanis.**

Almost as large; but pale luteous, the costa shaded with bright reddish, the outer third of median space olivaceous.....**stramentosa.**

Smaller, narrower winged, outer margin very oblique, as is also the t. p. line; pale red-brown, the median space darker.....**obliqua.**

10. Median space deeper in shade; t. p. line very oblique, followed by a whitish shading.....11.

Uniformly colored; no white shade following t. p. line.....12.

11. Reddish to brownish luteous; the serrations of the antennæ less prominent. **medialis.**

Much paler, with a wash of white over a dull luteous ground; serrations of the antennæ strongly marked.....**pallescens.**

12. Median lines narrow, hardly darker; t. p. irregular, geminate; ordinary spots paler, more yellow.....**senilis.**

13. Reddish luteous, the ordinary spots white.....**serrata.**

14. Lemon yellow, mottled with red-brown basally and beyond the t. p. line; the latter not well defined.....**cerina.**

Colors straw yellow to red-brown and fawn gray.....15.

15. T. p. line geminate, even, with an even out curve, which forms the angle just above the middle of the wing; the median shade line narrow, defined and parallel with the t. p. line.....16.

T. p. line sharply bent on the costa, forming the angle just below the subcostal; thence rather even and almost rigid to the inner margin.....17.

T. p. line geminate, quite evenly outcurved over the cell, not abruptly bent on the costa, the inner part of line more or less lunulated; median shade various.....20.

16. Size smaller, reniform obscure, rarely white marked; orbicular round or oval; claviform ovate, rarely white marked.....**inquæsita.**

Size large; reniform linear, white; orbicular and claviform also linear, upright and white in all specimens seen.....**speciosissma.**

17. Bright straw yellow, the usual markings outlined in brown; space beyond t p. line, save apex, brown.....**rigida.**

Yellowish to red-brown, powdery.....18.

Mouse gray, powdered with whitish atoms.....19.

18. Inner part of t. p. line distinct, outer line not fasciate, all beyond it except apex brown, mottled.....**harrisii.**

As before, but the terminal space is concolorous, leaving only the s. t. space brown.....**verona.**

Inner part of t. p. line obsolete or feebly developed, outer line forming a distinct band or fascia.....**purpurifascia.**

19. T. p. line well defined; s. t. line always traceable, usually distinct.

T. p. line angulate over cell, then inwardly oblique to hind margin. **nitela.**

T. p. line not angulate, and as a whole outwardly oblique to hind margin. **nelita.**

T. p. line barely traceable; s. t. line entirely wanting..... **necopina.**

20. Deep, blackish brown, with contrasting, white, ordinary spots, reniform normally wide; size moderate..... **limpida.**

As before, but much larger and the reniform is very narrow and elongate. **cerussata.**

Yellow to red-brown; ordinary spots concolorous or paler; never white...21.

Yellow to red-brown: ordinary spots wholly or partly white.....22.

21. Dull, powdery red-brown; t. p. line geminate, rather even, median shade well marked; ordinary spots indefined, dusky..... **frigida.**

Even, reddish luteous, all the lines defined but not contrasting; t. p. line lunulate; s. t. line well defined, preceded by a dusky s. t. shade. **unimoda.**

More reddish; ordinary spots obscured by a smoky shade, outer portion of t. p. line forming a purplish fascia..... **angelica.**

Yellow, powdered with purplish; basal space mostly purplish, and all beyond the t. p. line except apex, well shaded with the same color. **cataphracta.**

Rusty red-brown, very powdery; s. t. space purplish; median shade broad, well marked, blackish; apex of primaries unusually acute. **impecuniosa.**

22. Reniform moderate in size or rather small, the lower part not perceptibly larger than the upper; basal space not white marked.....23.

Reniform large or very large; the lower part distinctly larger than the upper; basal space usually white marked.....24.

23. Yellowish to red-brown, even, not powdery; t. p. line not contrasting; s. t. space hardly darker or purplish..... **circumlucens.**

Red-brown, strongly powdered so as to give a rusty appearance; t. p. line prominent, purplish, as are also most of the s. t. and terminal spaces. **rutila.**

24. Bright, deep, red-brown, strongly shaded with purplish, especially in s. t. space; basal space white marked..... **appasionata.**

Paler, more brick red, with the purplish shadings scarcely contrasting; base of wing white marked..... **marginidens.**

Very pale, almost straw yellow; no white marks inside of basal line; no purplish shadings; all the markings brown and well defined.. **furcata.**

Hydrœcia albilunata nom. nov., pl. 1, fig. 1, ♂ genitalia.

lunata Smith.

1891.—Smith, Trans. Am. Ent. Soc., xviii, 110, *Apamea.*

1891.—Smith, List Lepidoptera, 45, *Hydrœcia*

Ground color a reddish clay yellow with vague smoky shadings. Head and thorax without obvious markings. Primaries with the median lines rather feeble, evident, single, whitish. T. a. line rather well removed from the base, not at all prominent, rather evenly outcurved. The t. p. line better marked, but not in any way contrasting, evenly outcurved over the cell and rather evenly oblique below that point to the inner margin. The s. t. line is very faintly indicated. It is marked near the costa by a slight difference in shade between the apex and the space immediately within it, is traceable irregularly almost to the middle of

the wing, but lost below that point in the specimens before me. There is a slender black terminal line at the base of the fringes. The orbicular is entirely lost, or is represented only by a blackish dot. The reniform is a narrow, white, oblique lunule, margined by black scales and forming the only contrasting feature in the maculation. The submedian vein is shaded with blackish throughout almost its entire course. Veins 3 and 4 are shaded with blackish to the t. p. line, and vein 6 is black shaded through the s. t. space. Nearly all the veins are blackish marked in the terminal space. Secondaries very pale reddish gray, somewhat glistening, a little more powdered outwardly. Beneath almost whitish, with a reddish shading, the veins marked with dusky. Expanse 1.15 in.; 29 mm.

Hab.—Mt. Shasta District: Alameda, California, in June.

The term originally proposed by me proves to be preoccupied for a congeneric species, and I therefore substitute a new name. Few examples of the species have been seen in collections, and there seems to be little or no variation. The structure of the male genitalia is very simple. There is a moderately broad harpe bent near the middle, the tip round and fringed by a series of small spinules. There is a long, stout clasper extending from within the middle almost to the tip at its inferior margin. From about the middle of the harpe there starts a strongly curved cylindrical process, with a blunt, rounded tip forming a second clasper. The moth is very simply marked, and the species should be easily recognized. It is questionable whether it should not form, with *u-album*, a distinct series.

Hydræcia u-album Gn., pl. 1, fig. 2, ♂ genitalia.

1852.—Gn., Spec. Gen., Noct., i, 345, *Ceramica*.

1856.—Wlk., Cat. Brit. Mus., Het., x, 418, *C. v-album*.

1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 22, *C. v-album*.

1891.—Smith, Proc. U. S. Nat. Mus., xiv, 231, *Mamestra*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 174, *Hydræcia*.

purpuripennis Grt.

1874.—Grote, Proc. Ac. Nat. Sci. Phil., 206, *Apamea*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 174, pr. syn.

baliola Morr.

1874.—Morr., Proc. Bost. Soc. N. H., xvii, 148, *Orthosia*.

1875.—Grote, Can. Ent., vii, 58—*purpuripennis*.

1875.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 309—*purpuripennis*.

Ground color a rich purplish brown, varying somewhat in shade, sometimes becoming almost carneous. Head and thorax usually a little darker, more intensely brown than the primaries, without special markings. Primaries with a deeper, richer, reddish brown shade through the middle of the median space, and throughout the terminal space. At the base and along the inner and costal margin there is a distinct bluish shading, which varies in intensity in the specimens, sometimes relieving the reddish brown disc quite strongly. The median

lines are brown, single. The t. p. line is very irregular, preceded by a blnish shade and as a whole outwardly oblique. The t. p. line is slender, crennlated, sometimes defined by a following paler shade, sometimes scarcely traceable. The s. t. line is marked by the difference in tint between the terminal and s. t. spaces, and also by a series of whitish scales. There is a pale line preceded by a blackish shading at the base of the fringes. Sometimes the paler scales are absent, leaving only the dusky shading, and sometimes there is hardly any difference between the terminal space and the fringes. The basal half line is usually distinct on the costa. The orbicular is quite usually wanting: if present it is always small and may be a blackish dot, or a black annulus surrounding a whitish dot; or there may be a white annulus surrounding a brown central dot. The reniform is moderate in size, normal in shape, the lower half defined and partly filled by white scales, giving the appearance of a U, from which the name of the species is derived. Secondaries smoky brown with a purplish shade, the fringes paler, more rosy in tinge. Beneath paler, the primaries smoky, the secondaries more yellow. Both wings may have an outer dusky line, and on the other hand there may be no trace of this present. Expanse 1.10–1.30 in.; 27–32 mm.

Hab.—Massachusetts, May, June and August; New York in July; Illinois; Minnesota; Key West, Florida, Southern Florida.

The localities above given are those that happened to be represented in the collection before me. The insect probably extends throughout the entire Eastern United States and to the Mississippi Valley. It is readily recognizable by the form of the reniform, which contrasts strongly against the rich red brown ground color in which it is set. It has the same general shape of wing that is found in *albilunata*, and like that species the antennæ of the male are distinctly ciliated. The male sexual pieces are entirely different: the harpes are very broad at base, abruptly narrowed toward the tip, and the clasper is a short, broad-pointed process, resembling somewhat a broad beak. There is little variation, except in the amount of contrast between the brown and bluish or purplish shading on the wing.

Hydrœcia velata Wlk., pl. 1, fig. 3. ♂ genitalia.

1865.—Wlk., C. B. Mus. Het., xxxii, 671, *Apamea.*

1891.—Smith, Can. Ent., xxiii, 121, *Apamea.*

1893.—Smith, Bull. 44th U. S. Nat. Mus., 174, *Hydrœcia.*

sera G. and R.

1868.—G. and R., Trans. Am. Ent. Soc., i, 345, pl. 7, f. 55, *Hydrœcia.*

1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 18, *Hydrœcia.*

1874.—Grote, Proc. Ac. Nat. Sci. Phil., 1874, 206, *Apamea.*

1882.—Grote, Can. Ent., xiv, 170, *Helotropha.*

1884.—Bean, Can. Ent., xvi, 67, larva on *Anemone.*

1891.—Smith, Can. Ent., xxiii, 121, pr. syn.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 174, pr. syn.

Ground color a dark smoky brown, varying to gray or red-brown. Head and thorax without markings and of the usual ground color, except that the tips of

the scales may be gray on the thoracic crest. Primaries with all the markings traceable, but none of them contrasting. The basal half line is brown, visible on the costa in most specimens and sometimes below the cell. T. a. line imperfect, single, brown, almost upright, outcurved between the veins. T. p. line geminate, the inner line almost even or a little crenulated, slightly outcurved over the cell and a very little incurved below. The outer line is dotted, the dots connected by a dusky shading. The dots are on the veins and are black, followed by white in most cases. The white dots may be absent or they may be prominent and followed as well as preceded by a black dot. The median shade is broad, diffuse, well marked and forms an angle just below the reniform, which is inferiorly darkened by an extension of this shade. S. t. line pale, irregular, marked by the darker terminal space and by a dusky preceding shade. Near the costa it is defined by the paler apex and dusky s. t. space. There is a pale terminal line which is emphasized by black dots on the veins. All the veins are more or less flecked with white and black scales, particularly in the s. t. space and beyond it. The ordinary spots are moderate in size, concolorous or slightly paler, outlined by white and black scales. The orbicular is oval, oblique, the reniform upright, constricted in the middle and considerably dilated inferiorly. It is also blackish shaded in its lower portion. The fringes are distinctly scalloped, and the angle near the middle of the wing is much better marked than usual. Secondaries a smoky luteous, the fringes a little paler, with a darker line at their base. Beneath pale yellowish, primaries tending to become smoky, the secondaries tending to yellow. Both wings are powdered toward the edges, and both have a more or less well-marked outer dusky line and may have a discal lunule. Expanse 1.25–1.50 in.; 31–37 mm.

Hab.—Canada to Virginia, west to the Mississippi River, Missouri, Iowa. Date of flight June, July and August.

This is not an uncommon species, and occurs throughout the whole Northern, Eastern and Central United States. The specimens run even, and the species is recognizable by the fact that it is the only one in which the ordinary spots are outlined by white scales. The ring is a very narrow one, but is quite evident. The antennæ of the male are entirely simple. The harpes of the ♂ are long, very broad at the base, abruptly bent toward the tip, and at the point of bending is a large curved, corneous clasper, which extends to the tip and almost across the harpes at the base. Near the middle of each harpe is a slender, pointed process, which may be considered an accessory clasper.

Hydrœcia interoceanica n. sp., pl. 1, fig. 4, ♂ genitalia.

Ground color a very dark smoky brown, the ordinary markings almost blackish. In general the species resembles *nictitans*, or, more correctly, *atlantica;* but it is smaller, much darker in general color and, so far as the specimens in hand show, the reniform is uniformly white marked. The orbicular in all the specimens before me is round, considerably paler and more yellowish than the ground color, but without any trace of white markings. Expanse 1.10–1.25 in.; 28–31 mm.

Hab.—Winnipeg, Manitoba.

Three specimens, representing both sexes, are at hand from Mr. A. W. Hanham. I have no details regarding to capture of the species and no date. The insects were assumed to be forms of *nictitans,* and look like small, dark examples of that species. There is really very little that can be added to what has been already said concerning the male structural characters. The ciliations in the antennæ are very small and easily overlooked, except on close examination.

Hydrœcia atlantica n. sp., pl. 1, fig. 5, ♂ genitalia.

nictitans ‡ Auct., pl. 1, fig. 7, genitalia of European species.

1852.—Gn., Spec. Gen. Noct., i, 126, *Hydrœcia.*

1856.—Wlk., Cat. Brit. Mus. Het., ix, 159, *Hydrœcia.*

1874.—Grote, Proc. Ac. Nat. Sci. Phil., 206, *Apamea.*

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175, *Hydrœcia.*

nictitans var. *americana* Speyer.

1875.—Speyer, Stett. Ent. Zeit., xxxvi, 152, *Hydrœcia.*

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175 = *nictitans.*

Apamea lusca Harris mss.

1891.—Smith, List Lepidoptera, 45 = *nictitans.*

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175.

Ground color rusty red-brown, varying somewhat in shade, sometimes quite smoky, and occasionally a specimen will become decidedly more yellowish or even luteous in tint. The collar is a little paler inferiorly, a brownish line marking the point where the difference in shade begins. The edges of the patagiæ are often blackish. The primaries have all the markings distinct, but hardly contrasting, the lines being just a little darker than the ground color. The ordinary spots are paler in color, and either more rusty or more yellowish if they are not white filled. Basal line geminate, distinct, easily traceable to the submedian vein. T. a. line geminate, the space between the lines unusually wide. As a whole the line is upright, but outcurved between the veins. T. p. line geminate, the inner line irregular and crenulate, the outer often with a very faint outcurve. The median shade line is rather neatly marked, only a little broader than the other lines, a little more distinct, sharply angulated at the middle and a little incurved below. The s. t. line is dusky, tolerably well marked, darker than the terminal space and broken only at the apex, which is a little paler than the rest of the wing. All the veins are dusky and the venation is thus readily traceable. The orbicular is round or nearly so, moderate in size, narrowly ringed, a trifle paler than the ground color, rarely white. Reniform kidney shaped, moderate in size, sometimes a little constricted on the inner edge, but more usually irregular in shape. It may be a little paler than the ground color, it may be white, or it may be white marked to a narrow brown lunule which is near the inner border. The claviform is traceable in most specimens and is sometimes often even distinct. Ordinarily it is small, extending half way to the median shade, outlined as are the other spots and sometimes paler in color; never white marked in any specimen that I have seen. Secondaries smoky in some cases, almost blackish in others, again with a strong tendency to yellow. Beneath more or less smoky, especially on the primaries; both wings with an outer line and with a small discal spot. Expanse 1.15–1.40 in.; 29–35 mm.

Hab.—Nova Scotia, Hudson's Bay Territory, southward to Virginia, west to Colorado. Dates in New York range from early in July to late in August. In Illinois from the middle of July to the beginning of September.

This is the species that is ordinarily named *nictitans* in collections and, compared with the European examples of this species, it is almost impossible to say where the difference comes in. Superficially the markings are almost alike, and are certainly well within what is considered the ordinary range of variation. The antennæ in the male are very much alike, but the European examples are much more strongly ciliated than the Americans. The difference in the sexual characters has already been alluded to and need not be detailed again here. Our species seems, as a whole, to be a trifle more heavily built; but otherwise, and judging from superficial characters alone, their separation would hardly be justified. The range of variation in the species is not great; the difference in ground color is not particularly startling, although by placing the extremes together it is seen to be quite marked. There is a tendency to a violet tint in the s. t. space. In some cases the ordinary spots are both contrastingly paler and more rusty than the rest of the wing. In others there is hardly any difference to speak of. Finally, we may have examples in which the reniform becomes entirely white, and occasionally a specimen in which the orbicular also is of that shade. This species is the most common of those found in this country and deserves more attention than has been given to it heretofore.

Hydrœcia pacifica n. sp., pl. 1, fig. 6, ♂ genitalia.

This is the Californian representative of the European *nictitans*, and resembles the latter almost as closely as does its Atlantic relative. There is a difference here, however, which is quite noticeable when a good series of examples is under consideration. The Pacific Coast form is uniformly more chunky, the body is more heavily built, the thorax is squarer and the primaries are shorter and comparatively broader. Altogether it looks like a much more compactly built species. In average size it is smaller than the eastern form, but the wings are less pointed. So far as markings go there is not much difference, and certainly none that would be considered as of specific value. In all the examples before me, both sexes being represented, both the ordinary spots are rather contrastingly yellowish, and none of them show the least trace of white. The

antennæ of the male are almost entirely simple, the ciliations being even less marked than in the Atlantic Coast form. Examples of this species are in the collections of the U. S. National Museum, Rutgers College and E. L. Graef.

Hydrœcia juvenilis Grote, pl. 1, fig. 8, ♂ genitalia.

1881.—Grote, Bull. Geol. Surv., vi, 267, *Gortyna*.

1881. Grote, Trans. Kans. Acad. Sci., vii, 68, *Gortyna*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 174, *Hydrœcia*,

Ground color a rather pale yellow, with a more or less reddish tinge. Head and thorax without special maculation. All the wing markings well written and brown. Basal line geminate, distinct to the submedian vein. T. a. line geminate, as a whole almost upright, the inner part quite even to the submedian vein, there inwardly toothed and outwardly curved; the outer portion is more irregular, and to it is attached the little claviform, which extends a short distance into the median space. The t. p. line is single, unusually distant from the t. a. line and very close to the outer margin. It is crenulated, and as a whole almost parallel with the outer margin after the first outcurve over the cell. The median shade line is unusually distinct, crosses a little beyond the middle of the wing and forms almost a rectangle below the reniform. The s. t. line is brown, fairly well defined, except toward the apex, which is the palest part of the wing. The terminal space below the apex is darker than the balance of the wing in the majority of the specimens. In some cases the entire median space becomes suffused by a smoky shade. The ordinary spots are narrowly outlined and of the ground color or a little paler, never white in the specimens that I have seen. The orbicular is usually large, almost round or only a little oval. Reniform moderate or small, kidney shaped or oval. The claviform is small and has been already described. Secondaries smoky, with a purplish shade. The fringes with a distinctly paler line at base. Beneath yellowish, with a bright purplish outer line and sometimes an inner shade line on both wings. The secondaries have a small black discal spot. Expanse 1.10–1.20 in.; 28–30 mm.

Hab.—Colorado, foot hills near Denver; Glenwood Springs, September 16th.

Six examples, representing both sexes, are before me, and the only difference observable is the tendency to a smoky suffusion in the median space of some of the examples. The species is the smallest in average size of those belonging to this series and the wings are a little the most pointed The apex is distinctly acute, while the outer margin is only slightly pointed and unusually oblique. The male antennæ are almost simple. The genitalia are unique, the harpes long and narrowing toward the tip, except that there is a broad, short process from the middle of the lower margin. The tip is obliquely cut off and set with a few stiff spines. There is rather a large pointed clasper arising within the middle, extending well towards the tip, and at the point to which it reaches another smaller, cylindrical and slightly curved clasper is inserted into the harpe. The species does not seem to be common.

Hydrœcia immanis Gn., pl. 1, fig. 9, ♂ genitalia.

1852.—Gn., Spec. Gen. Noct., i, 128, *Hydrœcia.*

1856.—Wlk., Cat. Brit. Mus. Het., ix, 162, *Hydrœcia.*

1874.—Grote, Bull. Buff Soc. Nat. Sci., ii, 18, *Gortyna.*

1882.—Dodge, Can. Ent., xiv, 93, larva on Hop.

1884.—Smith, Bull. 4th Div. Ent. U. S. Dept. Agl., 38, larva.

1885.—Lintner, 2d Rept. Ins. N. Y., 41, larva.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175, *Hydrœcia.*

Ground color dull yellowish brown, with a tendency to smoky. Collar with a central pale line and a pale line at tip. In some specimens a pale line also extends obliquely across the patagiæ. The markings of the primaries are distinct, as a whole paler than the ground color; the defining lines a darker shade of brown or tan. Basal line geminate, extending to the submedian vein; the included space pale, the inner line fairly well marked, the outer rather diffuse. T. a. line geminate, the included space paler, the defining lines well marked, as a whole upright, very even, except for a slight inward bend in the cell. T. p. line geminate, included space pale, the inner defining line well marked, the outer rather defined by the differences in shade than in any other way. The line is abruptly bent on the costa over the reniform and then is almost evenly oblique inward to the inner margin. S. t. line blackish, distinct, a little irregular, broken only near the apex which is somewhat paler. The median shade is fairly well marked in most specimens, and is a little curved between the ordinary spots. Orbicular oval, almost upright, a little paler than the ground color, very often incompletely outlined. The reniform is large, upright, kidney shaped or a little constricted centrally, a trifle paler than the ground color, except that it is inferiorly sometimes a little darkened. There is a smoky brown line at the base of the fringes. The claviform is small, not visible in all the specimens; but sometimes dark filled so that it becomes quite a recognizable feature in the wing. Secondaries smoky, yellowish, darker in the female, with a dusky followed by a paler median line. There is a narrow dusky line at the base of the fringes. Beneath powdery, a little more reddish than on the upper surface; both wings with a more or less well-defined outer transverse line, the secondaries sometimes with a small discal spot. Expanse 1.50–2 in.; 37–50 mm.

Hab.—Northern United States to Iowa, South to Virgina; Colorado. New York and Illinois in August and September.

This is one of the largest species of this series, and at the same time most simple in markings. It resembles in general the European *micacea*, but is a larger species, and the antennæ of the male have the joints feebly marked and with very small brush-like tufts. There is no variation in the series before me, and nothing of any consequence in the species—so far as I have seen. The male genitalia have a rather long, narrow, bent tip which is fringed with spinules. There is a long, curved, semi-cylindrical clasper from the upper side near base, and there are two small, claw-like processes from the inferior margin a little beyond the middle. The larva of this species attaks the crown of hops, and it is of some economic importance.

Hydrœcia stramentosa Gn., pl. 1, fig. 10, ♂ genitalia.

1852.—Gn., Spec. Gen. Noct., i, 129, pl. 6, f. 2, *Hydrœcia.*

1856.—Wlk., Cat. Brit. Mus. Het., ix, 162, *Hydrœcia.*

1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 18, *Gortyna.*

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175, *Hydrœcia.*

Ground color a rather dull luteous, with a dash of olivaceous. Collar with a narrow brown line above the middle, the tip distinctly smoky, as are also the tips of the thoracic tuftings. Edges of the patagiæ marked with smoky brown, which is particularly well marked at tip. Sometimes the entire thorax is darker, and in such cases the contrasts between the ground color and the markings just described are not great. The abdominal tuftings at the base are also dark. The primaries have a reddish shade over the costal region extending to the tip. The outer portion of the median space is distinctly darker, olivaceous, and stands out quite evidently from the rest of the wing. The basal line is geminate, fairly well marked on the costa, then broken and only marked as a spot below that point. T. a. line geminate, the inner line scarcely traceable below the cell: as a whole it is nearly upright, but is inwardly curved through the cell and has a very feeble outcurve below that point. T. p. line very even, rather abruptly bent on the costa, a little outcurved over the reniform, and then evenly oblique inwardly to the inner margin. S. t. line irregular, brownish or smoky, marked by a preceding shade in the costal region, and beyond that by dusky scales arranged quite regularly. There is an even line at the base of the fringes, which are dusky at tip and have a reddish shade toward the base. The median shade line is well marked on the costa and is blackish to the median vein; below that point it is olive-green and hardly darker than the shading of the outer part of the median space. In the costal region, between the outer part of the basal line and inner portion of the t. a. line, there is a blackish shading and a similar, though much less marked, shading extends from the inception of the t. a. to the median shade line. The ordinary spots are well marked; the claviform is slightly soiled, olivaceous in color. Orbicular almost upright, irregularly oval, of the ground color or a little paler, outlined in olivaceous. Reniform upright, oblong, the angles pointed, hardly constricted in the center. It is of the ground color, or may have a slightly reddish tinge. Secondaries pale yellowish, without obvious markings. Beneath yellowish, both wings with a smoky outer line, which, in the specimens before me, does not extend across the wing. Expanse 1.68–1.72 in.; 42–43 mm.

Hab.—Glenwood Springs, Colorado, September 10th, October 1st, foot hills near Denver. "Middle and Central States, New York, Illinois."

Three specimens have been under examination, and I have seen others. None of them, however, from the East. There is a question, perhaps, whether this species is correctly identified. The examples before me agree with Guenée's figure and description, and I cannot remember having seen any species from the East which might be fitted to them. While I saw the type in the British Museum some years ago, my recollection does not serve sufficiently well to enable me to say whether or not this is really his species. I

believe it to be so, and that probably, in his original description, the locality "New York" was an error. The other localities given in my catalogue followed Mr. Grote's notes. I have never seen any specimens of *stramentosa* identified by Mr. Grote. The examples before me are all very much alike, and they are evidently related to *immanis*. The male genitalia, while agreeing with the series to which I have related it, are distinctive. The harpes are broad at base, narrow slightly until just before the end, where there is an abrupt cut from the lower side, which leaves a slender process that expands into a somewhat ladle-shaped tip, fringed inwardly with spines. There is a very heavy, stout, corneous clasper arising from the harpe just within the point at which it narrows a little, curved and terminating acutely. The antennæ of the male have the joints marked, and at the sides set with little bunches of soft short hair.

Hydrœcia obliqua Harvey, pl. 1, fig. 11, ♂ genitalia.

1876.—Harvey. Can. Ent., viii, 53, *Gortyna*.

1881.—Grote, Bull. Geol. Surv., vi, 268, *Gortyna*.

1884.—Smith, Bull. 4th Div. Ent. U. S. Dept. Agl., 38, *immanis*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175, *immanis*.

Ground color a somewhat sordid reddish brown, with a tendency to yellowish. Head and thorax without obvious markings, save that there may be a darker line across the collar above the middle. The primaries with all the marking traceable, but hardly contrasting: the t. p. line being the most prominent, and this best emphasized by the paler shade which follows it. The basal line is barely traceable across the costa. T. a. line not much better marked; but as a whole outcurved and outwardly curved between the veins. The t. p. line curves rather abruptly over the upper portion of the cell and is then rigidly oblique below. There is a slightly darker patch on the costa, which marks the inception of the s. t. line, and this is of such a shape that at first sight its edge seems to form the continuation of the t. p. line, making it appear as if that line extended obliquely from just within the apex to the hind margin. S. t. line pale, a little irregular, feebly marked by the slightly darker terminal space and sometimes also by a dusky preceding shade. There is a brown line at the base of the concolorous fringes. The median shade line is just traceable in most specimens. It is hardly to be distinguished on the costa, bends outwardly between the ordinary spots and is then angulated inwardly, running parallel to the t. p. line. A slightly darker shade extends through the median space below vein two. Ordinary spots barely outlined, of the ground color and moderate in size. Orbicular round or nearly so, varying somewhat. Reniform upright or nearly so, broad, rather irregular, kidney shaped. Secondaries pale yellowish, without obvious markings. Beneath pale yellowish, in some cases almost whitish, usually without markings, but sometimes with an incomplete outer line. Expanse 1-1.60 in.; 25-40 mm.

Hab.—Dakota, South Dakota, Colorado, Arkansas, Northern States west of the Mississippi to the Pacific Coast.

I had, from sufficient material, considered this species as a variety of the Eastern *immanis*, and I believe that there is some record of its having similar habits in the larval state. The species is a very good one, however, when abundant material is at hand. It runs uniformly smaller, is narrower winged than the eastern species, and there are other differences in the details of markings that will appear on a comparison of the descriptions. The male antennæ have the joints distinctly marked and obviously brush tufted, though the tuftings are short and of soft hair. The sexual organs are characteristic; the harpes rather narrow, stout, abruptly cut near the tip which is bent, somewhat dilated and has a fringing of rather long stiff spines. There are two clasper-like processes, the one nearest to the base small and rather blunt, the other inserted at the point where the harpe narrows, and this is more irregularly twisted. The differences in size are quite strongly marked; but in other respects there is little range of variation, judging from the examples before me.

Hydrœcia medialis Smith, pl. 1, fig. 12, ♂ genitalia.

1894.—Smith, Trans. Am. Ent. Soc., xxi, 74, pl. 1, *Hydrœcia*.

Ground color a dirty clay yellow, varying in shade to olivaceous in one direction and to distinct red-brown in the other. The median space of the primaries always darker and most richly tinted. Head and thorax without markings, the thoracic tuftings very feebly developed. Primaries with the markings rather obscure. The basal line is not obvious in any specimen before me. T. a. line pale, not contrasting, usually not margined inwardly, but sometimes with a slight darkening of brown scales; outwardly marked by the difference in shade between the basal and median spaces. It is usually a little curved in the cell and almost upright or only a little outwardly bent below that point. T. p. line pale, forming the most prominent feature of the wing marking; abruptly bent on the costa and then very evenly oblique to the inner margin. S. t. line pale, defined by the difference in shade between the darker terminal and pale s. t. space; but this difference is hardly appreciable. In some cases there is a brighter line at the base of the fringes. Ordinary spots visible, never entirely outlined and sometimes without distinct margins. Orbicular a little oval, oblique, somewhat paler than the median space, in which it is situated. Reniform kidney shaped, the upper portion fairly well outlined, as a whole a trifle paler than the surrounding space; but there is a dusky lunule through the centre which becomes darker inferiorly. There is a vague indication of a claviform in the shape of a slightly paler streak extending from the t. a. line half way across the median space. There is no visible median shade in any specimen before me. Secondaries varying from soiled whitish to very pale, almost straw yellow; a distinct dusky extra median line being present in all examples. Beneath a very pale shade of the ground color, a little powdery and with a rather broad smoky line on both wings. Expanse 1.60-2.05 in.: 40-52 mm.

Hab.—Washington; Colorado, foot hills; Glenwood Springs; collected by Bruce and Barnes.

This species is quite readily recognizable by the distinct contrast between the median space and the rest of the wing; the pale t. p. line being rather distinctly marked, quite narrow and well defined. The antennæ of the male are distinctly brush like, the joints are well marked, the lateral processes almost equal to the diameter of the joint in length and with tuftings of soft, bristly hair. The sexual pieces of the male are of the same general type as those previously described, but differ obviously in detail. The harpes narrow rather regularly toward the tip, which is cut off obliquely. There is a somewhat irregular, broad basal clasper, and toward the tip there is a beak-like process which terminates acutely. The species seems to be not uncommon where it occurs, and it varies in the ground color, which ranges from a dull, dirty, clay yellow to a bright, clean, reddish brown. The largest specimen seen is a male from Washington, in the Graef collection.

Hydrœcia pallescens n. sp., pl. 1, fig. 13, ♂ genitalia.

In general appearance and character this species resembles *medialis*, of which I at first considered it a variety. The chief difference, superficially, is in a decidedly paler ground color and an appearance as though there was a white washing over the entire surface. The ordinary spots are much more vaguely defined—in fact they can hardly be said to be defined at all, and in some cases are merely shadings, a little paler than the ground color. The t. p. line is not so definite outwardly and is rather a shade, which merges gradually into the usually darker s. t. space. The antennæ of the male have the processes on the joints longer and the bristles more prominent than in the other species. The sexual organs are in general like those of the preceding species; but the clasper is very long, semicylindrical, very broad at the base, with the edges irregular towards the tip. Expanse 1.50–1.90 in.; 37–48 mm.

Hab.—Calgary, August 21st, September 1st. Fort Klamath, Oregon, August 21st.

Hydrœcia senilis Smith, pl. 1, fig. 14, ♂ genitalia.

1894.—Smith, Trans. Am. Ent. Soc., xxi, 73, pl. 1, *Hydrœcia*.

Ground color a dull, rusty, red-brown, the veins darker. Head and thorax without obvious markings. Primaries without contrast, all the lines present, only a little darker than the ground color, narrow. Basal line geminate, extending to a submedian vein, but feebly marked, except on the costa. T. a. line single, slender, as a whole upright, but outwardly bent, curved or angulated between the veins. T. p. line geminate, slender, almost even or only a little marked on the veins; the inner line the darker and more obvious of the two, the space between the lines unusually broad. S. t. line indicated by the slight difference in shade between the darker terminal and lighter s. t. space. The median line is indicated by a vague dusky shading through the center of the wing. Orbicular small, round or nearly so, concolorous or a little paler, not definitely outlined. Reniform broad, oblique, a little irregularly kidney shaped, more rusty yellow

than the balance of the wing. Claviform narrow, pointed, extending to about the middle of the median space, concolorous or only a little paler. Secondaries smoky, paler toward the base. Beneath pale, with a tendency to a reddish or yellowish shading, somewhat powdery, the disc of the primaries tending to smoky. No outer lines in any of the specimens before me. Expanse 1.50–1.60 in.; 37–40 mm.

Hab.—Colorado, Bruce.

The insects were probably collected in the mountains not far west of Denver. The species is a very obscure one and resembles somewhat a very much washed out *atlantica*. It has also somewhat the appearance of a *Pachnobia*, and would easily pass for a member of that genus. In the male the antennal joints are marked, but not prominently so, and they are laterally set with tufts of soft hair. The male genitalia are imperfect in the specimen under examination and the tip of the harpe was broken off. There is a double clasper, the outer being broad at the base and the edges irregular, terminating in a sharp point. The inner is a small curved hook arising from a rather broad base and narrows rapidly to a sharp point. Very few examples of this species have been seen.

Hydrœcia serrata Grote, pl. 1, fig. 15, ♀ genitalia.

1880.—Grote, No. Am. Ent., i, 94, *Gortyna*

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 179, *Hydrœcia*.

Color a rather bright reddish yellow, the ground being yellow, washed with red to a variable extent. As a rule the head and thorax are quite obviously yellow. The red washing becomes evident at the sides of the palpi, on the front of the head, then at the sides of the collar, at its tip, on the thoracic tuftings, and then on the patagiæ which are quite frequently tipped with purplish. The tuft at the base of the abdomen is also quite usually purplish. The primaries have the basal space predominating in yellow, and yellow is also the shade extending along the costa and at the apex of the wing: else the red is most obvious. The basal line is very distinct, geminate, red-brown. T. a. line geminate, irregular, more or less broken, almost upright to the submedian interspace and then outcurved to the margin. The t. p. line is geminate, not so well defined, the included space yellowish, the inner defining line a little crenulated, the outer imperfect, but more even so far as traceable. Beyond this line the veins are narrowly dark marked. S. t. line obsolete in most specimens; but in some traceable by a few darker scales, emphasizing a difference between the s. t. and terminal spaces. There is a pale line at the base of the fringes, which are a little darker than the rest of the wing. The yellow apex has been already mentioned. The ordinary spots are white and contrasting. Orbicular round or nearly so, varying in size and usually with a central dot of the ground color. Reniform large, unusually broad, with a central yellow lunule surrounded by seven, more or less well-separated, white spots. The breaking up of the white spots is caused by the dusky veins which pass through the white filling. Claviform very broad and short, white, divided by a narrow central line which ex-

tends through it. Secondaries very pale, whitish, yellowish or a little smoky, darkening a little outwardly: the fringes usually with a reddish shading, which verges to scarlet. Beneath yellowish, pale, washed with reddish, which, in some specimens, has a distinct scarlet tinge towards the margins. Most specimens have an obvious dusky line on the secondaries, and a similar line is also apparent in many cases on the primaries. Expanse 1.25–1.50 in.; 32–37 mm.

Hab.—Colorado: Glenwood Springs, August 20th, September 1st (Dr. Barnes); Denver, September 12th (Oslar).

This species differs from all others in the genus by the lengthily pectinated antennæ of the male. It resembles, superficially, the species of the next series, and with them it has been heretofore associated. Besides the unique character of the antennæ, the form of the genitalia excludes it, as well as the absence of the adze-like thoracic tuft. The harpes of the male are narrow and quite even to the slightly pointed tip. There is a short, blunt, corneous process nearest to the tip, almost at the point reached by a long curved process or clasper, which originates within the middle and toward the lower margin.

Hydræcia cerina Grote, pl. 1, fig. 16, ♂ genitalia.

1874.—Grote, Proc. Ac. Nat. Sci. Phil., 200, *Gortyna*.

1882.—Grote, Ill. Essay, 59, pl. 2, f. 25, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 176, *Hydræcia*.

Ground color a bright lemon yellow, mottled with brown. Head bright reddish brown in front, the vertex yellow, base of the collar red-brown. The patagiæ are edged with brown, and the tuftings tipped in the same way. Basal line geminate, broken, the space between the basal and t. a. line more or less completely brown filled. The t. a. line is broken, imperfect, principally defined by the edge of the brown shading. T. p. line fragmentary, consisting of an irregular series of brown lunules, better defined by the brown s. t. space. The median shade consists of a series of brown marks and dots, which are not connected. S. t. line pale, marked by the difference in shade between the terminal and s. t. spaces, preceded by smoky, saggitate spots, which, in some cases, extend almost through the s. t. space. The terminal space is crossed by yellow, brown and smoky shadings, leaving the apex yellow. The fringes purplish brown. Secondaries very pale yellowish, tending to become a little dusky toward the tip. The fringes washed with reddish. Beneath a very pale yellowish, powdery, with a tendency to a reddish washing along the costa. Primaries with a discal lunule and a dusky shading near the outer margin. Expanse 1.40–1.50 in.; 35–37 mm.

Hab.—Maine; Kansas; London, Ontario; New Hampshire; Massachusetts.

This species is by no means common, but is easily recognizable by the bright lemon yellow ground color, the basal and extra median spaces being mottled with red-brown, which shades toward scarlet. Very few specimens have been seen, and there appears to be no appreciable variation, even in size.

Hydrœcia inquæsita G. & R., pl. 1, fig. 17, ♂ genitalia.

1865.—G. & R., Trans. Am. Ent. Soc., i, 344, *Gortyna.*

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 110, *Hydrœcia.*

1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 18, *Hydrœcia.*

1882.—Grote, New List, 29; *Gortyna quæsita* err. typ.

1882.—Grote, Can. Ent., xiv, 170, *Apamea.*

1893.—Smith, Bull. 44 U. S. Nat. Mus., 176, *Hydrœcia.*

Ground color yellowish brick red, powdered with rusty red and deeper brown. Head and thorax with a tendency to a violet shading, particularly on the collar and on the edges of the patagiæ, but this is not uniform. Primaries with most of the markings fairly well defined. The basal line is geminate, brown, hardly defined and in some specimens scarcely traceable. T. a. line geminate, the defining lines very narrow, brown, with a slight and rather even outcurve to the submedian interspace, and then a broader outcurve reaching the inner margin at the same point reached by the median shade line. T. p. line geminate, brown, outer line very distinctly darker and with a more violet shading: broadly bent or curved outwardly; the point nearest to the margin being at about the middle of the wing. The line is somewhat irregular on the costa; but very even on the incurve. S. t. line irregular, defined by the somewhat darker, more purplish s. t. space. The apex is of the paler ground color. Median shade very distinct, narrow, unusually well defined, angulated at about the middle of the wing, so that when viewed a little from the side it forms a perfect right angle. There is a dark, narrow, terminal line. All the veins are black marked, and their course is easily traceable throughout the entire wing. The ordinary spots are small, usually not very well defined. The orbicular is round or a little oval, somewhat paler than the ground color, although it may be contrastingly white. The reniform is upright or nearly so, kidney shaped, very poorly defined in most cases, sometimes with white marks around the edges. The claviform is very small, usually a little paler, yellowish, divided in the middle by a narrow brown line, which runs through the submedian interspace. In some cases it is white marked. Secondaries smoky, yellowish, sometimes with a tendency to a reddish shade, with a fairly well-marked smoky median line and often an obvious discal lunule. All the veins are dusky. Beneath pale, dirty yellowish, often with a reddish or carmine washing. Both wings with a more or less complete outer line and a traceable discal lunule. The veins on both wings are also dark marked. Expanse 1.05–1.50 in.; 26–37 mm.

Hab.—Kittery Point, Maine, August 18th. Long Island, N. Y., September 19th. New Hampshire in September. Generally distributed throughout the Northern and Central States east of the Mississippi.

This species is by no means a common one, and so far as shown by the specimens at hand seems to be very little subject to variation. The examples differ in size to a considerable extent, but very little in any other way. Ordinarily the spots are not white marked, but exceptionally they may become so. The very even geminate median lines and the very distinct and perfectly rectangular bend of the prominent median shade serve as distinguishing characters. The

antennæ of the male have very feeble lateral ciliations. The male genitalia are of the type that has been already described for this section. The triangular tip is well marked and the inner face is well set with short, stiff spinules. The clasper is of moderate size and well curved, with the upper edge distinctly and strongly serrated.

Hydrœcia speciosissima G. and R.

1868.—G. and R., Trans. Am. Ent. Soc., i, 342, pl. 7, f. 52, *Gortyna*.

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 111, *Hydrœcia*.

1881.—Grote, Bull. Geol. Surv., vi, 269. *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 177, *Hydrœcia*.

Ground color yellowish brick red, with darker powderings. Head and thorax more or less shaded by purplish brown. The lower portion of the collar and the edges of the patagiæ are particularly well shaded. Primaries with all the lines fairly well marked. The s. t. space is purplish brown, and is the only contrasting portion of the wing, so far as ground color is concerned. The basal line is geminate, rusty brown, and extends to the middle of the submedian interspace. T. a. line geminate, brown, the inner portion most distinct, as a whole forming a very even, slight outcurve to the submedian vein, and then bending outward abruptly to the hind margin at about the point which is reached by the median shade. T. p. line geminate, brown, the outer portion of the line broader and more purplish. The line is outwardly oblique to vein 5, then bent rather abruptly, and runs inwardly oblique to the hind margin. S. t. line defined by the differences between the s. t. and terminal spaces, and as thus defined showing sharp teeth outwardly on the veins. There is a narrow, brown terminal line. The median shade line is distinct, rather narrow, fairly well defined and angulated on the median vein just before the end of the cell. The ordinary spots are narrow and upright. Orbicular narrow, oval, upright and white. Reniform very slender, narrow, defined by brown scales and white. Claviform also upright, very short and broad. All the veins purplish brown, so that their course is traceable throughout the entire wing. Secondaries very pale yellowish or purplish, the veins darker. Beneath shaded with purplish; the secondaries with a distinct outer line, primaries with an indication of a similar line, which is not complete in any specimen before me. Expanse 1.74–2.10 in.; 44–53 mm.

Hab.—Massachusetts in September; Ridgewood, N. J., August 30th. Long Island, N. Y.; New Hampshire.

This is the largest of the species belonging to this series. In general appearance it very much resembles *inquæsita*, but in all cases the ordinary spots are narrow, upright and perfectly white. This, in addition to the strongly angulated median shades makes the insect an easily recognizable one. Of this species I have seen no males. I have had, perhaps, from all collections, a dozen females; but I have not been able to get hold of the opposite sex. Were it not for the fact that both sexes of *inquæsita* were represented in my collection I would have been inclined to consider these two as sexes of one species.

Hydrœcia rigida Grote, pl. 1, fig. 18, ♂ genitalia.

1877.—Grote, Can. Ent., ix, 87, *Gortyna.*

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna.*

1882.—Grote, Papilio, ii, pl. 1, f. 3 and 3*a*, *Gortyna.*

1882.—Grote, Ill. Essay, 58, pl. 2, f. 24, *Gortyna.*

1893.—Smith, Bull. 44 U. S. Nat. Mus., 176, *Hydrœcia.*

Ground color very pale straw yellow. Head purplish gray, except on the vertex, which is of the ground color. Base of the collar also tinged with purplish gray. The bases of the patagiæ and anterior tuft are also purplish. The same shade may be found in some specimens at the base of the abdomen. Primaries shaded with purplish between the basal and t. a. lines above the submedian vein, and also in the s. t. space below the apex. Basal line geminate, brown, extending to the middle of the wing. T. a. line apparently single, the inner portion merged into the dusky shade; broadest and most prominent from the costa to the median vein, to which point it is outwardly and evenly oblique. It forms a rectangle above from that point to the submedian vein and is then curved outwardly, the line appearing geminate at this point. The t. p. line is unusually close to the outer margin, but starts from the costa just within the apex and runs evenly oblique to the hind margin, leaving an unusually wide median space. S. t. line narrow, brown, lunulate, with distinct outer teeth on the veins; usually better defined by the difference between the purplish s. t. and paler terminal spaces. In some cases the terminal space is almost as dark as the s. t. space and in such cases the s. t. line is scarcely traceable. The apex is of the ground color. There is a narrow terminal line at the base of the fringes. Median line narrow, brown, with an even outcurve, which is bent just below the lower angle of the median cell. The ordinary spots are of good size, ringed with brown; orbicular round or nearly so, sometimes with a brown central dot; reniform upright, a little constrictly centrally. In some specimens there is an inner lunule. Secondaries very pale yellowish, almost white; a blackish line at the base of the fringes, sometimes an outer dusky line and occasionally with a lunule and marginal shading. Beneath very pale, the veins smoky, sometimes with a discal lunule, and more frequently with a smoky outer line. Expanse 1.25–1.45 in.; 31–36 mm.

Hab.—Kittery Point, Maine, September 14th; Torrington, Conn.; Onondaga Valley, N. Y., September 15th; Massachusetts; Illinois.

It is probable that this species is found throughout New England and a portion of the Middle States, west to the Mississippi River; but it is by no means common. It shows very little variation, and its very pale straw yellow color will serve to distinguish it. The genitalia are after the usual type in this series. The male antennæ are furnished with short ciliæ.

Hydrœcia harrisii Grote, pl. 2, fig. 19, ♂ genitalia.

1881.—Grote, Bull. Geol. Surv., vi, 268, 276, *Gortyna.*

1893.—Smith, Bull. 44 U. S. Nat. Mus., 177, *Hydrœcia.*

Ground color a rusty red-brown, underlaid by a yellowish shade, very powdery. Head shaded with purplish, collar purplish, except at the tip where it is yellowish; patagiæ more or less purplish, with a tendency to a yellowish powdering in the center, which sometimes embraces the entire thorax. Abdominal tuftings

also purplish, the abdomen itself varying from yellowish to purplish. The primaries very strongly powdered through the median space, with all the ordinary markings fairly well written. Basal line geminate, brown, extending to the middle: within this line the wing is yellowish, forming a yellowish spot at the base. The rest of the basal space is more or less purplish, or very strongly powdered with deeper red-brown. Sometimes this powdering invades the extreme base, and it may thus become uniformly purplish. T. a. line geminate, not very well defined. From the costa it is upright or a little inwardly oblique to the submedian vein, then it makes an abrupt outcurve to the hind margin near the middle of the wing. T. p. line well removed outwardly, geminate, the inner line the narrower of the two, the outer line darker. It bends abruptly outward on the costa, then forms what is practically an acute angle and runs very evenly oblique to the inner margin. S. t. line dentate on the veins, very irregular, brown, best marked by the difference between the purplish s. t. space and the more evenly brown terminal space. The apex yellowish. There is a blackish line at the base of the purplish fringes. The median shade is fairly well marked, not well defined, rather narrow, and in a general way it is upright or a little bent on the median vein. Ordinary spots fairly well defined, rather small; the orbicular round, usually white, sometimes with a central dot, sometimes reduced to a white point surrounded by a few darker scales, in one specimen almost black. Reniform upright, narrow, a little constricted centrally, with a very narrow central lunule, which is defined by brown edges, and outside of this there may be from one to seven whitish or white spots. Sometimes the entire reniform is white, though occasionally it becomes blackish. The claviform is short and broad, divided by a narrow central line; usually it is white, sometimes it is reduced to a mere dot, and in one specimen it is blackish. Secondaries more or less smoky, shading to yellowish in one direction and to almost blackish in another. Veins smoky in most cases; a smoky discal lunule and generally also a more or less obvious outer smoky line are present. Beneath more or less washed with purplish. Both wings with a fairly well-defined median line and usually with a discal lunule, which is always more or less distinct on the secondaries. Expanse 1.42–1.68 in.; 33–42 mm.

Hab.—Kittery Point, Maine, August 30th to September 19th; Massachusetts; New York.

Most of the specimens that I have seen of this species come from Dr. Thaxter, and I have, by his kindness, a series of nine specimens which show a greater range of variation than any other species of the genus. This variation consists not in the maculation, but entirely in the amount of the dark powdering which extends through the wing. In one case the wing is almost yellowish, with scattered brown powdering and a slightly darker s. t. space. The extreme in the other direction is a dark smoky brown shade, with just an indication of the yellowish base. The s. t. space is uniform, purplish, almost blue, while the ordinary spots are nearly black. Between these extremes all intergrades are represented, yet the species is dis-

tinct in all cases. Its nearest common relative is *purpurifascia*, and this almost always has the t. p. line single and forming a rather well-marked band, which gives rise to the name. It has also much brighter color, and is distinctly less powdery than the species under consideration. In other respects the type of marking is almost the same, and without attention to the characters just mentioned, particularly the t. p. line, it is rather easy to confuse the two. In the male the genitalia offer nothing that is peculiar or different from the other allied species. The antennæ are, as usual, ciliated; the ciliations extremely short and forming little brush-like tufts.

Hydrœcia verona n. sp., pl. 2, fig. 20, ♂ genitalia.

Ground color a rather sordid, yellowish red-brown, powdered with smoky and brighter red-brown. Head, base of collar and the edges of the patagiæ shaded with purplish. Primaries shaded with purplish at the extreme base, between the basal line and t. a. lines. The space above the median vein is shaded with smoky, and the s. t. space is almost blackish. Basal line geminate, reaching to the middle of the wing. T. a. line rather indistinct, best marked by the difference in shade between the median and basal spaces, geminate, inwardly bent to the submedian interspace, then with an outward bend to the hind margin. T. p. line distinctly geminate, both lines even, the inner narrower and not so dark as the outer. S. t. line irregular, dentate on the veins, marked chiefly by the difference in color between the s. t. and terminal spaces. A smoky terminal line. The veins through the terminal space are brown. Median shade fairly well defined, brown, rather evenly curved, touching the inner portion of the reniform. The space between the ordinary spots is powdered with purplish or smoky. Ordinary spots white marked. Orbicular upright, broadly oval, moderate in size, white, with a small central purplish dot. The reniform upright, moderate in size, a little constricted centrally, consisting of a central yellow lunule, around which are grouped more or less evident white spots. The claviform is short and broad, white, divided by a broad line, which runs through the submedian interspace. Secondaries yellowish, with a smoky tint outwardly, the veins marked with smoky. Beneath very pale yellowish, the veins smoky, both wings with an extra median line and with a feebly-marked discal spot. Expanse 1.10 in.; 27 mm.

Hab.—Winnipeg, Manitoba.

A single male specimen was received from Mr. Hanham. It resembles *harrisii* most nearly, and differs chiefly in the fact that the s. t. space contrasts with the terminal, resembling *purpurifascia* in that particular. In fact the species is intermediate in most respects between *harrisii* and *purpurifascia*. The male genitalia are distinctive, while yet they agree with the ordinary type, and reference to the figure will best describe the structure. The scantiness of the material prevents any suggestions as to the range of variation or other characters of the species.

Hydrœcia purpurifascia G. and R., pl. 2, fig. 36, ♂ genitalia.

1868.—G. and R., Trans. Am. Ent. Soc., i, 341, pl. 7, f. 51, *Gortyna.*

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 110, *Hydrœcia.*

1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 19, *Ochria.*

1874.—Grote, Can. Ent., vi, 216, *Gortyna.*

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna.*

1893.—Smith, Bull. 44th U. S. Nat. Mus., 176, *Hydrœcia.*

1897.—Slingerland, Can. Ent., xxix, 161, pl. 6, larval hist.

leucostigma || Harr.

1862.—Harris, Ins. Inj. Veg., 440, *Gortyna.*

1863.—Grote, Proc. Ent. Soc. Phil., ii, 432 = *rutila.*

1865.—Grote, Proc. Ac. Nat. Sci. Phil., iv, 325 = *cataphracta.*

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 111 = *rutila.*

1881.—Grote, Bull. Geol. Surv., vi, 268? = *harrisii.*

1898.—Bird, Can. Ent., xxx, 129, pr. syn.

Ground color a rather bright yellowish brick red, powdered with deeper brown and shaded with purplish. Head purplish. Collar purplish, except at the tip. Thoracic tufts and the edges of the patagiæ purplish. Abdomen with a more or less evident purplish shading throughout. Primaries with all the markings fairly well defined. Basal line geminate, extending to the middle of the wing: within this the wing is of the ground color, otherwise the rest of the basal space is purple. T. a. line geminate, the outer portion of the line usually more or less obsolete, except below the submedian vein, where it is generally distinct. In course it is oblique from the costa to the median vein, then almost upright or inwardly oblique to the submedian vein and then outcurved. T. p. line usually single, abruptly bent outwardly on the costa, and then broad and evenly oblique to the hind margin, forming a rather distinct band, which is much darker than any other portion of the wing. In some specimens the inner portion of the line is traceable for a portion of the distance. S. t. line lunulate, outwardly dentate on the veins, further emphasized by the purplish s. t. space, which contrasts against the more reddish terminal space. There is a brown line at the base of the purplish fringes The apex is of the brown ground color, the median shade line narrow, distinct in most specimens, red-brown in color, moderately bent on the median vein. The orbicular is white, round or nearly so, with a brown central dot. The reniform is upright or a little oblique, moderate in size, a little constricted centrally. There is a central lunule, and outside of this there may be one or more white spots, which may combine to form a white margin around the spot. The claviform is short and broad as usual, divided, the lower portion almost always white, the upper portion more or less white, rarely entirely so, and sometimes without any white scales. Secondaries very pale yellowish, with a purplish shading, the veins smoky, a purplish submarginal band, and the fringes also shaded with this color. Beneath powdery, very strongly shaded with purplish, particularly along the costa and towards the apex. Both wings with an extra median line, and the secondaries with a dusky lunule. In some cases the dusky color of the s. t. space is reproduced on the underside. Expanse 1.12–1.52 in.; 28–38 mm.

Hab.—Maine and Massachusetts in September and August; Holderness, N. H., September 21st; New York in August and September; Illinois; Colorado.

This species extends probably throughout all the Northern, Eastern and Middle States, and to the Rocky Mountains in Colorado. It is one of the most common forms in the genus, and its life history has been well written by Mr. Bird.

Mr. Bird has also cleared up the synonymy of Harris's species *leucostigma*, a name, which, unfortunately, has been preoccupied. The species varies little, except in the intensity of the coloring. Its nearest ally is *harrisii*, and the differences from that species have already been pointed out The genitalia of the male agree in a general way with those of the group, save that the clasper is unusually small and slender. The spinulation of the tip of the harpes is also less dense than in the immediate allies.

Hydrœcia nitela Gn., pl. 2, figs. 21 and 22, ♂ genitalia.

1852.—Gn., Spec. Gen. Noct., i, 124, *Gortyna.*
1856.—Wlk., Cat. Brit. Mus. Het., ix, 158, *Gortyna.*
1869.—Pack., Guide to Study Ins., 310, f. 241, *Gortyna.*
1869.—Riley, 1st Rept. Ins. Mo., 92, larva.
1870.—Riley, Amer. Ent., i, 22, f. 11, larva.
1873.—Grt., Bull. Buff. Soc. Nat. Sci., i, 111, *Hydrœcia.*
1875.—Pack., 9th Ann. Rept. Geol. Surv., 719, pl. 65, f. 6, *Gortyna.*
1876.—Riley, 8th Rept. Ins. Mo., 37, larva.
1880.—Riley, Amer. Ent., iii, 201, f. 107, *Gortyna.*
1883.—Saund., Fruit Insects, 334, f. 347, 348, larva.
1883.—Osborn, Can. Ent., xv, 174, larval habits.
1884.—Lintner, 1st Rept. N. Y. State Ent., 110, f. 26, larva.
1893. Smith, Bull. 44th U. S. Nat. Mus., 178, *Hydrœcia.*
1898.—Bird, Can. Ent., xxx, 127, habits and early stages.

var. *nebris* Gn.

1852.—Gn., Spec. Gen. Noct., i, 124, *Gortyna.*
1856.—Wlk., Cat. Brit. Mus. Het., ix, 157, *Gortyna.*
1878.—Graef, Bull. Bkln. Ent. Soc., 1, 7, pr. var.
1881.—Riley, Papilio, 1. 107, habits and var.
1881.—Riley, Index and Supplt. to Mo. Repts., 56, pr. syn.

Ground color fawn gray, with a more or less reddish tinge, varying somewhat in specimens, powdery. Head and thorax with a distinct violet powdering, caused by the pale termination of the scales on head and thorax. Basal line barely distinguishable, paler, terminating at the middle of the wing. T. a. line yellowish, outcurved between the veins, with a deep inward tooth on the submedian vein and a broader outcurve below that point. The space within this line is apt to be a little paler and with a violet powdering, but this varies. T. p. line yellowish or whitish, geminate, the outer portion of the line usually rather indistinct. The line is oblique from the costa to opposite the middle of the cell, then makes an obtuse angle and runs obliquely to the hind margin. A pale shade extends outwardly from the line through the s. t. space almost to the terminal line. S. t. line variable in distinctness, made up of yellowish or whitish scales when best marked, lunulate, the teeth being outward on the veins, irregu-

lar. It is preceded by a brown shading, and the terminal space is usually a little darker than the s. t. space. Ordinary spots varying much in distinctness: they may be almost obsolete, they may be indicated by smoky or blackish clouds, and they may be distinct and white marked. In the latter case the orbicular is small, rather irregular, often with a central dot. The reniform is rather narrow, upright, marked with yellowish in the center and this with white outer margins. The claviform is divided into two spots, of which the upper may be wanting or punctiform; the lower is irregular in shape and may be anything from round to square. Secondaries smoky to blackish, the veins darker, in some case with a smoky lunule. Beneath gray, powdery, the secondaries a little paler than the primaries; both wings with a more or less obvious outer line, which tends to become lost on the primaries. Both wings with a small discal spot, which also tends to become lost on the forewings. Expanse 1.40–1.60 in.; 35–45 mm.

Hab.—Canada to Georgia, west to the Rocky Mountains, Eastern States in September; northern Illinois September 15th; Normal, Illinois, July, August 20th, September 23rd and 25th; Schenectady, N. Y., September 23rd. Westchester County, N. Y., in September; Kansay City, Mo., August 18th; Mississippi in August.

This insect has two very well marked forms that have received different names. The typical *nitela* is that form in which the ordinary spots are barely traceable and are never white marked. The most prominent feature of the wing is the pale t. p. line, from which a light shading extends through the s. t. space. In the form *nebris* the t. p. line is not so prominent a feature and the ordinary spots are all white marked. In other respects I have been unable to find any difference, and in a long series of examples, such as I have had under examination, it is easy to pick out a series showing all the intermediate forms. The male offers no points of special interest, but agrees in a general way with the structure of the group. As this insect has an economic interest it has been written about more than any other, except *immanis* and the supposed *nictitans*. Like the rest of its tribe the caterpillar is a borer and infests grasses of various descriptions, as well as a number of other plants. Figure 22 illustrates the genitalia of the form *nebris*, and this figure is better than 21, which is distorted on the slide. The two are introduced to show that apparent differences may present themselves from differences in the preparation.

Hydrœcia nelita Strecker.

1898.—Streck., Lep. Rhop. and Het., Supplt. No. 1, p. 8, *Hydrœcia*.

Ground color a reddish gray or fawn brown. Collar tipped with white scales. On the primaries all the markings are obscured, neither the basal nor the t. a. lines traceable. The t. p. line seems single: in course it is bent outward and then is almost straight or outwardly oblique to the hind margin, a short distance

within the angle. Beyond this line the wing is shaded with purplish and is thus a little lighter than the basal portion. The s. t. line is pale, irregular, broken, preceded by a dusky shading. There is a dusky shade at the base of the fringes, which is broken by white dots at the end of the veins. The ordinary spots are marked by dusky clouds on the costa. There are three white dots in the s. t. space. Secondaries yellowish, smoky, veins and a lunule darker. Beneath yellowish, powdery, with a purplish tinge. Secondaries with an outer dark line. Both wings with a discal lunule. Expanse 1.20 in.; 30 mm.

Hab.—Northern Illinois; Cartwright, Manitoba (Heath).

Through the kindness of Mr. Strecker I owe a male of this species, which I was at first inclined to consider a form of *nitela*. The course of the t. p. line, however, is so different and so constant in the examples in Mr. Strecker's possession that I concluded him correct in separating the species under the new name. In a general way the markings are like those of *nitela*; but the t. p. line is much less evident, besides differing in course. The species is also smaller than *nitela*, though small specimens of the latter occur. More material is needed to define the species satisfactorily. In sexual characters it does not differ to any appreciable extent from *nitela*.

Hydræcia necopina Grote, pl. 2, fig. 23, ♂ genitalia.

1876.—Grote, Can. Ent., viii, 25, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 179, *Hydræcia*.

1898.—Bird, Can. Ent., xxx, 131, habits and early stages.

Ground color fawn gray or brown, powdered with fine whitish or bluish atoms. Head and the inferior portion of the collar a richer dark brown, without the powdering, otherwise there is no marking on either head or thorax. Primaries almost uniform in color, the median space slightly darker; the t. p. line traceable in most specimens, but never prominent in any: when best marked it is seen to be geminate, made up of two very narrow lines, between which is a powdering of whitish scales. In some cases even this is entirely wanting and the wing is apparently uniform in color. Secondaries smoky, the veins a little darker and a tendency to a discal lunule. Beneath mouse gray, powdered with white scales. The fringes darker and uniform, except that they are tipped with white. Expanse 1.60–2 in.; 40–50 mm.

Hab.—Middle States; Westchester County, New York, in September; London, Ontario, Canada

This insect is one of the most easily recognizable of all the species, because of its almost uniform coloration. At first glance it resembles *nitela*, and indeed looks like that species with all the markings taken out, except the merest traces of the t. p. line and the somewhat paler shading in the s. t. space. None of the examples that I have seen, and by the kindness of Mr. H. Bird I have a very pretty series before me, has any trace of an s. t. line. The

structural characters of the male do not differ from those of *nitela*, save that the tip of the harpes is not nearly so strongly notched, while the clasper itself is somewhat heavier. The insect is by no means common, and so far as I am aware no one has had as many specimens as Mr. Bird, who has written of its early stages.

Hydræcia limpida Gn., pl. 2, fig. 24, ♂ genitalia.

1852.—Gn., Spec. Gen. Noct., i, 124, *Gortyna*.

1856.—Wlk., Cat. Brit. Mus. Het., ix, 157, *Gortyna*.

1873.—Grote, Bull. Buff Soc. Nat. Sci., i, 110, *Hydræcia*.

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 178, *Hydræcia*.

Ground color a very deep umber-brown, the median space of the primaries shaded more red-brown: the s. t. and sometimes the basal and terminal spaces as well, with a purplish tinge. The collar is tipped with whitish. Primaries with the markings traceable in most cases; but the chief ornamentation consists of the contrasting white ordinary spots. Basal line marked by yellowish scales. T. a. line hardly defined in any examples seen by me; principally marked by the slight difference in shade between the basal and median spaces. This indicates that it is a little incurved to the submedian veins and then bent strongly outward to the hind margin. T. p. line geminate, almost blackish, with an outward bend to vein 4 and then somewhat incurved in its course to the inner margin. S. t. line irregular, marked by reddish or yellowish scales and by a series of blackish spots which may be irregular, lunulate or formed into an almost continuous line. There is a blackish line at the base of the fringes, which are usually a little darker than the terminal space, but may be a little lighter. The median shade is blackish, outwardly bent from the middle of the costa to the lower angle of the reniform, then inwardly bent almost to the middle of the inner margin. Ordinary spots white, the orbicular irregular, usually with a central brown dot; the reniform oblique, moderate in size, a little constricted centrally, and the lower portion usually wider than the upper. It is made up of a narrow yellow central lunule, around which are grouped seven irregular white spots. Sometimes the central lunule is also white. The claviform is double, that is, consists of two spots, which may be of about the same size, or they may be different. Either one of them may be the larger, and either of them may be reduced to a mere point. The apex has usually a yellowish or reddish tint. Secondaries smoky, blackish, the veins marked, a discal lunule present in some cases. Beneath gray, powdery, sometimes almost purplish, becoming broken outwardly. Both wings with an exterior line and a dark discal lunule. Expanse 1.28–1.60 in.; 32–40 mm.

Hab.—Eastern and Middle States; Webster, New Hampshire, September 26th; Jefferson, N. H., in August; Chicago, Ill., September 24th.

This is one of the dark species in which the ordinary spots are white and contrasting; prominent because of the contrast, which has a tendency to obscure the balance of the ornamentation which is exceedingly ill marked. Most of the specimens that I have seen

are females, and in fact only two males are before me at the present time. The range of variation really consists only in the intensity of the brown shading. It may verge to red and it may tend to blackish. In the lighter specimens the lines are somewhat better defined; in the darker specimens they are almost lost. In other respects the markings are very constant.

Hydrœcia cerrusata Grote, pl. 2, fig. 25, ♂ genitalia.

1861.—Grote, Proc. Ent. Soc. Phil., ii, 431, pl. 9, f. 1, *Gortyna*.

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 110, *Hydrœcia*.

1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 18, =*limpida*.

1875.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 216, sp. dist.

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 178, *Hydrœcia*,

Ground color a very deep purplish brown, the median space of primaries more red-brown, but yet very dark. Head and thorax without markings, save that the collar is white tipped. Primaries with white blotches at the extreme base, within the basal half line, which is geminate and marked with white scales. T. a. line geminate, outcurved between the veins, with a long inward tooth in the submedian interspace and a long outcurve below that point. The line is emphasized by slightly paler scales between the ordinary defining lines. T. p. line geminate, with a broad outcurve over the cell and a slight incurve below. It is feebly lunulate between the veins. S. t. line irregular, outwardly toothed on the veins, in some cases forming a vague W, marked on veins 3 and 4. Marked further by yellowish or reddish scales, which form a pale apex to the wing and preceded by blackish scales, which form a more or less broken series of dots or an imperfect shade. A blackish line at the base of the fringes. The median shade is blackish, bent below the cell, not very well defined and yet easily traceable in every instance. The reddest portion of the wing is the median space below the submedian vein. The ordinary spots are contrasting, white, the orbicular almost triangular, the angles a little pointed, the base resting on the median vein. The reniform is unusually long and narrow, obliquely set, the center yellow, around which are grouped white spots. As a whole the lower part of the spot is broader than the upper; but in all cases the spot as a whole is very narrow. The claviform has the usual double white mark, and in all the specimens before me the two spots are of almost equal size. Secondaries smoky, the veins yet darker, a discal lunule visible. Beneath purplish, gray powdered, with an outer line, which is most distinct on the secondaries, and a discal lunule, which is also more prominent on the hind wings. Expanse 1.68–2.20 in.; 42–55 mm.

Hab.—Middle and Eastern States, south to the District of Columbia: Washington, D. C., August 10th; Massachusetts in September; Iowa; Illinois.

This species is a close ally to *limpida*, and there is very little in the general appearance to distinguish the two. The color is practically the same, the markings are almost identical, except for the shape of the reniform, and this in *cerrusata* is unusually long and narrow. In *limpida* it has the more usual form, and there is noth-

ing about the form to attract attention. Mr. Grote has pointed out this character and it remains about the only one that I can find.

We are not left without positive proof of its distinctness, however, because, as already pointed out, there has been a remarkable break here in the character of the male genitalia, which can be best understood and appreciated by comparing figures 24 and 25 on plate 2. The explanation for this peculiar change in structure is yet to be discovered.

Hydrœcia frigida n. sp., pl. 2, fig. 26, ♂ genitalia.

Ground color a dull reddish brown, more or less powdered with black. Head and thorax with a purplish gray shading. Primaries with all the markings obscure. T. a. line geminate, darker brown, very irregular, somewhat inwardly bent, but with a considerable outcurve below the submedian vein. The basal space is obscured, and, as the specimen is slightly defective, the basal line cannot be made out. T. p. line geminate, smoky, blackish, very even, a little outcurved over the cell and almost parallel with the outer margin below that point. The included space is a little more yellowish. S. t. line irregular, blackish, broken, somewhat lunulate below the middle, preceded by a blackish shading, which is outwardly relieved by a few yellowish scales. As a whole the s. t. space is a little more purplish than the rest of the wing; the terminal space also being somewhat darker than the middle. The apex is yellowish, the fringes are blackish. The median shade is broad, diffuse, blackish, just a little outcurved below the reniform. Orbicular brown, small, a little irregular, with a center of the ground color. Reniform moderate in size, a little oblique, with a brown outline and a brownish central band. Secondaries smoky gray or blackish, with a vague extra median line and discal lunule. Beneath yellowish, with purplish scales along the costal margins. Both wings with a vague, extra median line and small, black, discal spots. Expanse 1.25 in.; 31 mm.

Hab.—Winnipeg, Manitoba, Mr. A. W. Hanham.

The type is a male and the only specimen that I have seen. The genitalia are not unlike those of the typical form, but altogether more chunky, while the clasper is shorter and heavier in proportion. The male characters resemble those of *cerussata*; but the tip is set with much shorter and stouter pointed processes, which can hardly be called spines. The clasper is broad at the base, narrowing abruptly and forming a somewhat irregular hook, which has a jagged tip. Although very much smaller and quite different in appearance, it is evident that the species is allied to *limpida*, where the combination of superficial characters has placed it.

Hydrœcia unimoda Smith, pl. 2, fig. 27, ♂ genitalia.

1894.—Trans. Am. Ent. Soc., xxi, 73, pl. 1, *Hydrœcia*.

Ground color a rusty yellowish red, more or less powdery. Head and thorax with the edges of all the parts tipped with darker scales. Primaries with all the markings evident, but not contrasting. Basal line geminate, the space within it

being lightened by yellowish scales. T. a. line geminate, broken, as a whole outwardly oblique to the submedian vein and then outcurved to the inner margin. T. p. line geminate, smoky, the inner lunulate, as a whole outwardly bent over the cell and a little incurved below that point. The s. t. line is paler, marked by yellowish scales. The apex is yellowish, preceded by dusky scales, which form lunules or a continuous shade. All the veins dusky. Median shade smoky brown, fairly well defined, bent at the end of the median vein. The ordinary spots concolorous, orbicular of good size, narrowly ringed by brown scales, round or nearly so; reniform, moderate in size, the sides almost equal, narrowly defined by smoky scales. Claviform double, as usual in the genus, narrowly outlined by brown scales. Secondaries whitish to smoky, with a discal lunule, an extra median dusky line and subterminal dusky shade, beyond which the wing is paler and shades to a dusky terminal line. Beneath whitish or with a reddish tinge, powdery, both wings with an outer smoky line and discal lunule. Expanse 1.50 1.60 in.; 37 40 mm.

Hab.—Colorado, Bruce.

Male and female are before me and differ little except in the slightly darker shading of the male, which may not be a permanent difference. The species is easily recognizable by the uniform rusty coloration, without any contrasts, and on which the ordinary lines or markings are yet fairly well evident. The male agrees with the species preceding in the sexual characters. The harpes are very broad at the base, narrow very abruptly to a rounded tip, and this is rather densely clothed with stout pointed spurs or stiff spines. The clasper is a very simple, stout, slightly curved claw.

Hydrœcia angelica n. sp., pl. 2, fig. 28, ♂ genitalia.

Ground color a yellowish luteous, more or less powdered with brownish scales. Head and thorax with a strong mingling of purplish brown scales, which are well evident at the tip of the patagiæ and on the posterior tuft. Primaries with the markings obscure, except that the t. p. line is well marked. Basal line traceable, the basal space a little purplish powdered. T. a. line geminate, nearly upright, with a distinct angulation on the median vein, an inner tooth on the submedian vein, and an outcurve below that. The outer part of the line is a little rusty and hardly traceable; the inner is purplish and shades into the basal space. T. p. line geminate, the inner line rusty, evident, but not contrasting; the outer portion broad, prominently shaded with purplish brown. The inception of the line is a little beyond the middle and inside the reniform, but it bends abruptly on the subcostal vein to beyond the cell. Over this it is somewhat broadly outcurved, and is then almost evenly oblique to the inner margin, broken by a small outward tooth on the submedian vein. The s. t. line is vaguely indicated by a series of obscure rusty lunules, which are just barely traceable. There is a series of terminal brown lunules, and beyond this the fringes evenly purplish. The median line is obvious, narrow, brown, irregular, but as a whole nearly upright in course, much closer to the t. p. than the t. a. line. Orbicular rather small, round or nearly so, with a narrow brown ring and a brownish central dot. The reniform is large, kidney shaped, not well defined, with a brown lunule at the end of the cell. Inferiorly there is a smoky patch, which extends backward along the median vein nearly to the orbicular. Secondaries whitish, with a glistening yellow tinge, which shows a dash of purplish reflection. Veins a little

dusky marked, with a faint extra median line, as well as a smoky discal lunule. Beneath pale straw yellow, powdery. Both wings with a brownish, extra median line; secondaries with a blackish discal spot. Expanse 1.36 in.; 34 mm.

Hab.—Los Angeles Co., Calif., collected by Mr. Coquillet and numbered 421.

The specimen is a male from the U. S. National Museum and is in good condition, save that the abdomen is a little greasy. In sexual characters the insect is typically like the white-spotted forms; but there is no trace of white marks in the example before me. On close comparison it will be seen that the markings are like *nitela*, and the insect has its relations most evidently with the series, of which that species forms a part. The male characters in this species revert to the type. As usual in this section of the genus we have the forked tip set with spines; and the rather long, curved, pointed clasper, the edges of which, in the single specimen that I have had under examination, seem to be even.

Hydrœcia cataphracta Grote, pl. 2, fig. 29, ♂ genitalia.

1864.—Grote, Proc. Ac. Nat. Sci. Phil., iii, 81, pl. 2, f. 3, *Gortyna*.

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 111, 142, *Hydrœcia*.

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.

1891.—Dyar, Can. Ent., xxiii, 157, larva.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 176, *Hydrœcia*.

1898.—Bird, Can. Ent., xxx, 128, larva.

Ground color yellow, with purplish powderings and shadings. Head and thorax almost entirely purplish; the tip of the collar and the disc of the thorax remaining of the ground color. Primaries with all the markings fairly evident. Base, within the geminate basal line, of the ground color. T. a. line geminate, rather evenly outcurved, or almost upright to the submedian vein, and then with a long outcurve. From the costa to the submedian vein the basal space is purplish, except as already stated. T. p. line geminate, the inner line very narrow, brown, outcurved over the cell and a little incurved below. The inner line more or less lunulate, and this indeed may be the case with the outer line, though, as a rule, it is almost even. The s. t. space is purplish and usually contrasts with the terminal space, which is more nearly of the ground color and relieves the irregular, outwardly dentate s. t. line. The fringes are purplish, a white dotlet marking the end of each vein. The apex is of the ground color, and below that the terminal space is more or less powdered with purplish. The median shade line is variably distinct, sometimes a mere vague powdering, sometimes quite sharply defined as a narrow line, which is bent at the lower end of the reniform. The median space is powdered with rusty brown, except in the ordinary spots, which are thus relieved, though not differing in any other respect from the ground color. Orbicular moderate in size, round, or with a tendency to become triangular, narrowly ringed by brown scales. Secondaries smoky, tending to become shaded with purplish, which is the case also with the abdomen. Beneath the ground color is yellowish, strongly powdered with gray and brown. Both wings with a smoky outer line, the secondaries with usually a distinct discal spot, which may be indicated on the primaries as well. Expanse 1–1.80 in.; 25–45 mm.

Hab.—Canada to District of Columbia, west to Colorado. Canada in Sept.; Northern New York in Oct.; Westchester Co., N. Y., Sept.

Except for the variation in size this species differs little. There is a difference in the amount of the purplish shading, particularly beyond the t. p. line. There is also some difference in the amount of contrast and in the amount of powdering in the median space, but in other respects it runs remarkably constant. Except for the species of economic importance this seems to be the most common of the lot, and is most generally represented in collections. The male structures are typical of this section of the genus. The triangular tip is well set with spinules, and the long curved clasper has the edges distinctly irregular.

Hydrœcia impecuniosa Grote.

1881.—Grote, Bull. Geol. Surv., vi, 267, *Gortyna*.

1882.—Grote, Can. Ent., xiv, 184, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 176, *Hydrœcia*.

Ground color a powdery, rusty red-brown, more or less shaded with purplish. Head and thorax very strongly shaded. Primaries with the extreme base of the ground color to the geminate basal line. T. a line outwardly bent between the veins, as a whole upright to the submedian vein, then with a long outcurve to the inner margin. Above the submedian vein the basal space, except within the basal line, is purplish. T. p. line geminate, unusually close to the outer margin, the inner line very feebly developed and hardly distinguishable in some specimens; the outer broad and distinct, very strongly bent below the costa and then running almost parallel with the outer margin and inwardly oblique to the hinder margin. S. t. line, yellowish, defined chiefly by the difference between the purplish s. t. space and the less powdery terminal space. The apex of the palest ground color. Fringes purplish. The median shade is unusually prominent, blackish or very dark purplish brown, almost rectangularly bent below the reniform. The ordinary spots are well defined, but not white marked. Orbicular small, round, with a central brown dot, else of the palest ground color. Reniform moderate or rather small in size, only a little constricted in the center, with the usual central lunule, but otherwise without powdering. The claviform is double, as usual, of the palest ground color and without powdering in the specimens before me. Beneath powdery, shaded with purplish, with a broad, common outer line and a fairly well-marked discal lunule on both wings. Expanse 1.20–1.50 in.; 30–37 mm.

Hab.—Massachusetts; New York; New Hampshire; Illinois. Ithaca, N. Y., October 6th; Amherst, Mass., September 20th; Champaign, Ill., at electric light, September 27–28th.

This is a rare species apparently, and I have seen only four specimens in which, fortunately, both sexes are represented. The species is quite markedly distinct by the unusually pointed primaries. They are really acute, and as a whole are rather narrower than those of the other species immediately allied to them. In the male the sexual pieces offer nothing that is peculiar.

Hydrœcia circumlucens n. sp., pl. 2, fig. 31, ♂ genitalia.

Ground color an even yellowish or red-brown, with powderings. Head and thorax shaded with purplish; a white tuft at the base of the antennæ. The disc of the thorax is more nearly of the ground color, and indeed the amount of purplish shading varies in the different examples. Primaries with a white dot at the middle of the base, all the lines traceable, but none of them contrasting. Basal line geminate, extending to the middle of the wing, sometimes a little white marked, occasionally, in the darker specimens, scarcely traceable. T. a. line geminate, as a rule white marked on the costa, but this also varies; a little incurved and inwardly oblique to the submedian vein and then with the usual strong outcurve. T. p. line broadly bent over the cell, well removed outwardly, then oblique and a little curved to the inner margin. The line is geminate; but the inner portion is quite usually obsolete. S. t. line marked by the contrast between the usually darker s. t. space and the terminal space; also emphasized by a few yellowish scales. It is outwardly toothed on the veins and irregular as a whole. The apex is yellowish. The veins are marked with purplish, the median shade line narrow, purplish brown, not contrasting, bent below the reniform. The inception of the t. p. line on the costa is marked by a white spot, and there are three white dots on the costa before the s. t. line. The ordinary spots are white and contrasting; the orbicular triangular, narrowly outlined by dark scales, the reniform moderate in size, a little constricted centrally, the lower portion a little broader than the upper, the central portion consisting of a yellow lunule surrounded by white, broken into spots as usual by the veins. The claviform is double, white, the upper spot being uniformly smaller than the lower. Secondaries varying from yellowish to purplish, sometimes with a central lunule. Beneath shaded with reddish over a yellowish ground, hardly powdered, even on the secondaries the veins a little darker. An outer line in most of the specimens under examination, though a trace only in the darkest examples. Expanse 1.28 1.60 in.; 32-40 mm.

Hab.—Newark, N. J.; Long Island, N. Y.; Pennsylvania; Champaign, Ill.; Nebraska.

This species has been confused with *rutila* in collections generally; but it differs from that species quite obviously. It is a very narrow form in the first place, which makes the primaries look shorter, it is even in color, without powderings, and finally there is hardly any contrast between the different portions of the wing: the s. t. space, especially, being scarcely darker than the balance of the wing. There is very little variation, so far as the specimens before me indicate. Altogether ten examples have been under examination from various collections. The male offers nothing that is peculiar, and is of the regulation type for this series. The clasper seems a little more toothed than in *rutila*, and is perhaps a little longer in proportion. The tip of the harpe is not quite so much notched.

Hydrœcia rutila Gn., pl. 2, figs. 32 and 33, ♂ genitalia.

1852.—Gn., Spec. Gen. Noct., i, 123, pl. 6, f. 1, *Gortyna*.
1856.—Wlk., Cat. Brit. Mus. Het., ix, 157, *Gortyna*.
1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 111, *Hydrœcia*.
1881.—Grote, Bull. Geol. Surv., vi, 268, *Gortyna*.
1893.—Smith, Bull. 44 U. S. Nat. Mus., 177, *Hydrœcia*.

Ground color yellowish red, powdered with rusty brown. Head and thorax shaded with purplish, a white tuft at the base of the antennæ, tip of the collar pale. There is a white spot at the middle of the extreme base of the wing. Basal line geminate, extending to the middle of the wing and within it the base is of the palest ground color. Beyond this line the basal space above the submedian vein is filled with purplish, and this sometimes extends through the cell, forming a dark cloud, which is quite prominent in some specimens. T. a. line geminate, inwardly oblique, rather difficult to trace in most examples, except below the submedian vein, where it is strongly outcurved. T. p. line geminate, outcurved over the cell and almost evenly oblique below that point. S. t. line irregular, outwardly dentate on the veins, the lower rusty brown. The s. t. space is contrastingly purplish, and this shading may extend so as to darken the terminal space, except at the apex. The fringes are also purplish. The median shade line is narrow, not very obvious in most cases above the reniform, obliquely inward to about the middle of the inner margin. The ordinary spots are distinct; the orbicular moderate in size or rather large, with a tendency to become triangular in shape, sometimes with a dusky central dot. The reniform is moderate in size or rather small, almost even, the white margining spots rather narrow, so that as a whole the spot is not so strongly contrasting as in some other cases. The claviform is double, the upper spot as a rule hardly half the size of the lower, the latter varying from round to oval, the oval being the more usual form. Beneath yellowish, powdered with purplish, with a discal lunule and a more or less obvious outer line on both wings. Expanse 1.28-1.68 in.; 32-42 mm.

Hab.—From Canada to Virginia, west to Colorado; Maine; Massachusetts; New York in September; Central Illinois, August 29th; Champaign, Ill, August 3rd.

This is one of the most common forms belonging to this series and is represented in most collections. It is powdery, and the contrasting s. t. space is easily recognizable in good examples. The reniform is not strongly contrasting, the white spots being narrow and the central portion or lunule being itself not very large. There is nothing to be added to what has been already said of the sexual characters, which are of the usual type. In the figures 33 shows the parts flattened out on the slide and distorted by crushing. It is a camera lucida sketch like all the others and illustrates the importance of seeing rightly.

Hydrœcia appasionata Harv.

1876.—Harv., Can. Ent., viii, 155, *Gortyna*.

This species is perhaps best described by comparison with *rutila*, with which it is generally confused in collections. It is indeed, on close examination, more like *limpida*, but much redder in general tint. The main characteristic in this species is the very large reniform, the inferior portion of which is much larger than the upper, and this constitutes the most striking feature. The primaries are also much more prominently shaded with purplish, this shading extending through the median and filling almost the entire terminal space. In other respects and in general type of marking the resemblance to *rutila* is evident. Expanse 1.20-1.50 in.; 32-37 mm.

Hab.—Long Island, N. Y.; London, Ontario.

By the kindness of Mr. Moffatt I have an example from London,

from which locality Dr. Harvey's type was received. This example agrees very well with the description, and I have no others that agree as closely. Dr. Harvey's specimen was evidently a very fresh example, in which all the contrasts were well defined. Ordinarily the examples appear much more sordid than mentioned by him. Only three examples all told are before me and none of those are males.

Hydrœcia marginidens Gn., pl. 2, fig. 34, ♂ genitalia.

1852.—Gn., Spec. Gen. Noct., i, 123, *Gortyna.*

1856.—Wlk., Cat. Brit. Mus. Het., ix, 157, *Gortyna.*

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 111, *Hydrœcia.*

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna.*

1893.—Smith, Bull. 44 U. S. Nat. Mus., 177, *Hydrœcia.*

Ground color a muddy, yellowish red-brown. Head and thorax with a slight purplish shade, the tip of the collar white, a white tuft at the base of the antennæ. Primaries not strongly powdered. As a whole the median space is slightly more reddish or yellowish than the rest of the wing, the basal space and all beyond the t. p. line having a purplish or darker red-brown shading. Basal line geminate, extending to the middle of the wing, and between it and the base the wing is white. T. a. line geminate, not strongly marked, very frequently with white scales between the brown defining lines: its course, as usual, a little incurved to the submedian interspace and then strongly outcurved to the margin. T. p. line broadly curved over the cell, then inwardly oblique. It is geminate, the outer portion heavier, purplish and irregular, the inner more brown and with a strong tendency to become lunulate. S. t. line pale, irregular, dentate on the veins, largely defined by a slight difference in shading between the terminal and s. t. spaces. There is a brown terminal line at the base of the fringes, and the apex is yellowish. The median shade line is narrow, usually fairly well defined, a little irregular, somewhat evenly outcurved, or with only a feeble angle below the reniform. Sometimes it is a little lunulate. The ordinary spots are all present; the orbicular white, moderate in size tending to become triangular, often with a brown central dot, reniform large in every direction, little constricted centrally, considerably broader inferiorly than above. There is the usual irregular central lunule, which, in this species, is also white and is completely surrounded by white spots, which are bounded by the brown veins. The claviform is as usual broken, the two parts similar in size, the upper crossed by a portion of the t. a. line, and as a whole a little smaller than the other. The secondaries are dull, very pale yellowish, with a rosy tinting. There is an outer line visible in some specimens and this may be modified into an s. t. shade. In some instances a smoky lunule is also visible. Beneath pale, shading from yellowish to purplish, more or less powdery along the margins, with a rather distinct and narrow outer line, and a more or less evident discal lunule, which is quite frequently absent on the primaries. Expanse 1.50–2 in.; 27–50 mm.

Hab.—Northern, Eastern and Middle States. Albany County, N. Y., Sept. 18th; Illinois in Sept.; New Jersey; Virginia; Mass.

This is a large species resembling *cerrusata* in some respects. It is easily distinguished from the other red species by the irregular reniform, which, besides being very large, has the inferior portion much broader than the upper. In this it agrees with *appassionata,* but that species is smaller, much deeper in color and more powdery.

Some of the small examples of this species I have seen marked *rutila* in collections; but for that species the shape of the reniform is always a good distinctive feature. The male characters are much as in the allied species, except that the harpes are unusually broad, the clasper is perhaps a little longer and more twisted than usual; but this may be due to the large size of the entire insect.

Hydrœcia furcata n. sp., pl. 2, fig. 35, ♂ genitalia.

Ground color varying from straw yellow to reddish luteous. Head and thorax in the paler specimen with a rosy tinge, particularly well marked on the head, at the sides of the collar and at the tips of the thoracic and abdominal tuftings In the darker specimens this tuft becomes purplish. Primaries with all the markings fairly evident. Basal line geminate, brownish, tending to become obscure, and in the darker specimens merged into the ground color, leaving the intervening spaces a little paler. T. a. line geminate, brownish, irregular, as a whole somewhat inwardly oblique from the costa to the submedian vein, below which it makes an outcurve so that the termination of the line on the internal margin is almost opposite its inception on the costa. Here also the tendency is, in dark specimens, to lose the lines and leave the included spaces a trifle paler. T. p. line geminate, crenulate, the inner line best defined, but the outer one almost equally distinct. As a whole the line is very evenly curved over the cell and below that point nearly parallel with the outer margin or with only a slight incurve. S. t. line irregular, outwardly dentate on the veins, somewhat lunulate and marked by a preceding dusky shading, the terminal space being a little paler, except where cut by the brownish veins. There is a terminal brown line, beyond which the fringes are brownish or a little purplish. There is an obvious median shade which is a little diffuse, outwardly oblique from the middle of the costa to the median vein, where it touches the reniform, and is then inwardly oblique and even to the inner margin. The orbicular is white, defined by a brownish line and is somewhat irregularly oval. The claviform is elongate, a little irregular, also white and with a brown outline. Between these two spots is a small white dot situated just below the median vein and also with brown outlines. A small white dot is on the median vein just beyond the basal line. The reniform is very large, a little constricted centrally, the lower portion considerably broader than the upper; the center of the spot a yellowish lunule, which is incompletely ringed with white, the white extending beyond the cell and cut up into small spots by the brown veins which run through it. In all there are seven spots varying in size and shape according to their location, which compose the outline of the reniform. Secondaries whitish or yellowish, without markings of any kinds. Beneath whitish or yellowish, immaculate. Expanse 1.25 1.80 in.; 31–45 mm.

Hab.—Long Island, N. Y.; Carlstadt, N. J., Doll; Manchester, N. H., Ottolengui; Urbana, Ill., Forbes.

Five specimens, all males, are before me. The insect resembles very strongly the *serrata* of the Rocky Mountain fauna; but the antennæ of the male are ciliated only, the joints hardly marked. The insect also resembles *marginidens* quite strongly and is probably confused with that species in collections. It differs by the paler color throughout, by the general absence of white spots in the basal

space inside of the basal line, by the very small dot between the white orbicular and claviform, and finally by the shape of the reniform, in which the center is never white and in which the inferior portion is very much larger than the upper. In the secondaries of this species there is no trace of maculation. Finally, and more important than all, the sexual pieces are characteristic. While the harpes agree in a general way with those of *marginidens* and its allies, the clasper is absolutely unique. We have what may be considered the typical hook; but near its apex there arises a long, slender, curved branch like the prong of a deer's horn. There is nothing like this in the genus, and the species is therefore easily recognized when a male is at hand. The range of size is as great as that of *marginidens*, which it so closely resembles.

Mr. Doll informs me that the larva of this species bores in the young shoots of ash.

Hydrœcia erepta Grote.

1881.—Grote, Bull. Geol. Surv., vi, 267, *Gortyna.*

1893.—Smith, Bull. 44 U. S. Nat. Mus., 175, *Hydrœcia.*

"A stout and rather aberrant form. Eyes naked; front unarmed; tibiæ unarmed; feeble dorsal tuftings on the abdomen. Yellow. Fore wings dull orange yellow with the lines fuscous, simple. The exterior well removed outwardly, a little waved between the veins. Half line present; interior line uneven, a little outwardly projected below median vein. Claviform a simple outline, incomplete. Orbicular concolorous, a small ringlet. Reniform small, a white half-mooon in a blackish shade. Hind wings dull yellowish, with faint discal mark and exterior line. Beneath dull yellowish, with faint exterior common line and discal marks. The insect is nearly concolorous; fore wings and thorax darker. An even terminal line on primaries. Antennæ simple, ciliate beneath. Expanse 34 mm."

Douglas County, Kansas, Professor Snow.

Synonomical List of the Species.

HYDRŒCIA Gn.

HYDRŒCIA.

1. H. albilunata *Sm.*
   lunata ‖ Sm.
2. H. u-album *Gn.*
   purpuripennis Grt.
   baliola Morr.
3. H. velata *Wlk.*
   sera G. and R.
4. H. interoceanica *Sm.*
5. H. atlantica *Sm.*
   nictitans ‡ Auct.
   americana Speyer.
   lusca Harr., mss.
6. H. pacifica *Sm.*
7. H. juvenils *Grt.*
8. H. immanis *Gn.*
9. H. stramentosa *Gn.*
10. H. obliqua *Harv.*

11. H. medialis *Sm.*
12. H. pallescens *Sm.*
13. H. senilis *Sm.*
14. H. serrata *Grt.*

PAPAIPEMA.

15. H. cerina *Grt.*
16. H. inquæsita *G. and R.*
quæsita Grt.
17. H. speciosissima *G. and R.*
18. H. rigida *Grt.*
19. H. harrisii *Grt.*
20. H. verona *Sm.*
21. H. purpurifascia *G. and R.*
leucostigma || Harr.
22. H. nitela *Gn.*
var. *nebris* Gn.
23. H. nelita *Strck.*
24. H. necopina *Grt.*
25. H. limpida *Gn.*
26. H. cerussata *Grt.*
27. H. frigida *Sm.*
28. H. unimoda *Sm.*
29. H. angelica *Sm.*
30. H. cataphracta *Grt.*
31. H. impecuniosa *Grt.*
32. H. circumlucens *Sm.*
33. H. rutila *Gn.*
34. H. appasionata *Harv.*
35. H. marginidens *Gn.*
36. H furcata *Sm.*

Unknown to me.

37. H. erepta *Grt.*

EXPLANATION OF PLATE I.

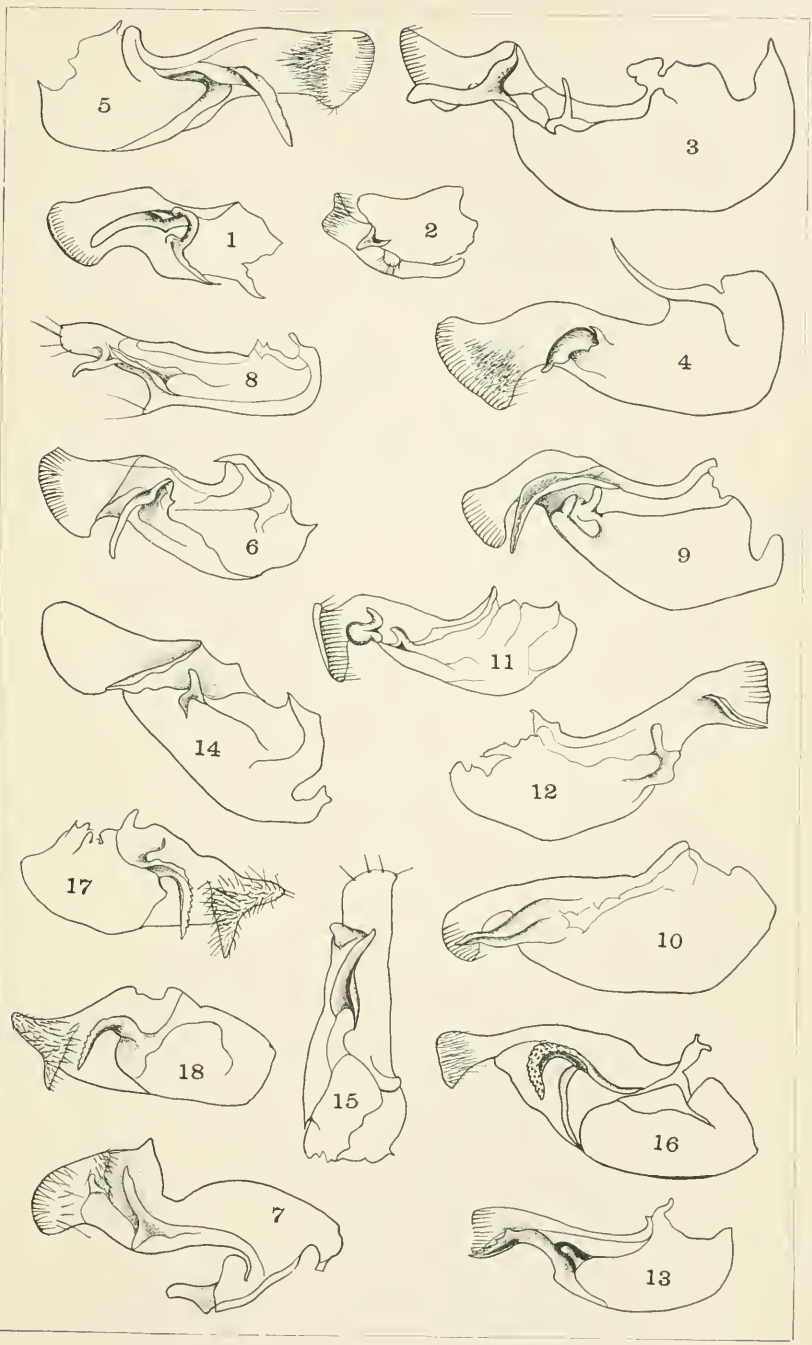
Male genitalia of *Hydræcia*, the figures showing harpe and clasper in each case. The figures on plates 1 and 2 are numbered consecutively.

1. H. albilunata *Sm.*
2. H. u-album *Gn.*
3. H. velata *Wlk.*
4. H. interoceanica *Sm.*
5. H. atlantica *Sm.*
6. H. pacifica *Sm.*
7. H. nictitans *Linn.* (Europe).
8. H. juvenilis *Grt.*
9. H. immanis *Gn.*
10. H. stramentosa *Gn.*
11. H. obliqua *Harv.*
12. H. medialis *Sm.*
13. H. pallescens *Sm.*
14. H. senilis *Sm.*
15. H. serrata *Grt.*
16. H. cerina *Grt.*
17. H. inquæsita *G. and R.*
18. H. rigida *Grt.*

EXPLANATION OF PLATE II.

19. H harrisii *Grt.*
20. H. verona *Sm.*
21. H. nitela *Gn.*
22. H. nebris Gn.
23. H. necopina *Grt.*
24. H. limpida *Gn.*
25. H. cerrussata *Grt.*
26. H. frigida *Sm.*
27. H. unimoda *Sm.*
28. H. angelica *Sm.*
29. H. cataphracta *Grt.*
30. H. impecuniosa *Grt.*
31. H. circumlucens *Sm.*
32. H. rutila *Gn.* normal.
33. H. rutila *Gn.* distorted by flattening.
34. H. marginidens *Gn.*
35. H. furcata *Gn.*
36. H. purpurifascia *G. and R.*

Purpurifascia is out of its place in the numbering; it should have followed *H. verona*. No. 22 is the normal form in *nitela*; *nebris*, No. 21, has the clasper and the harpe a little flattened.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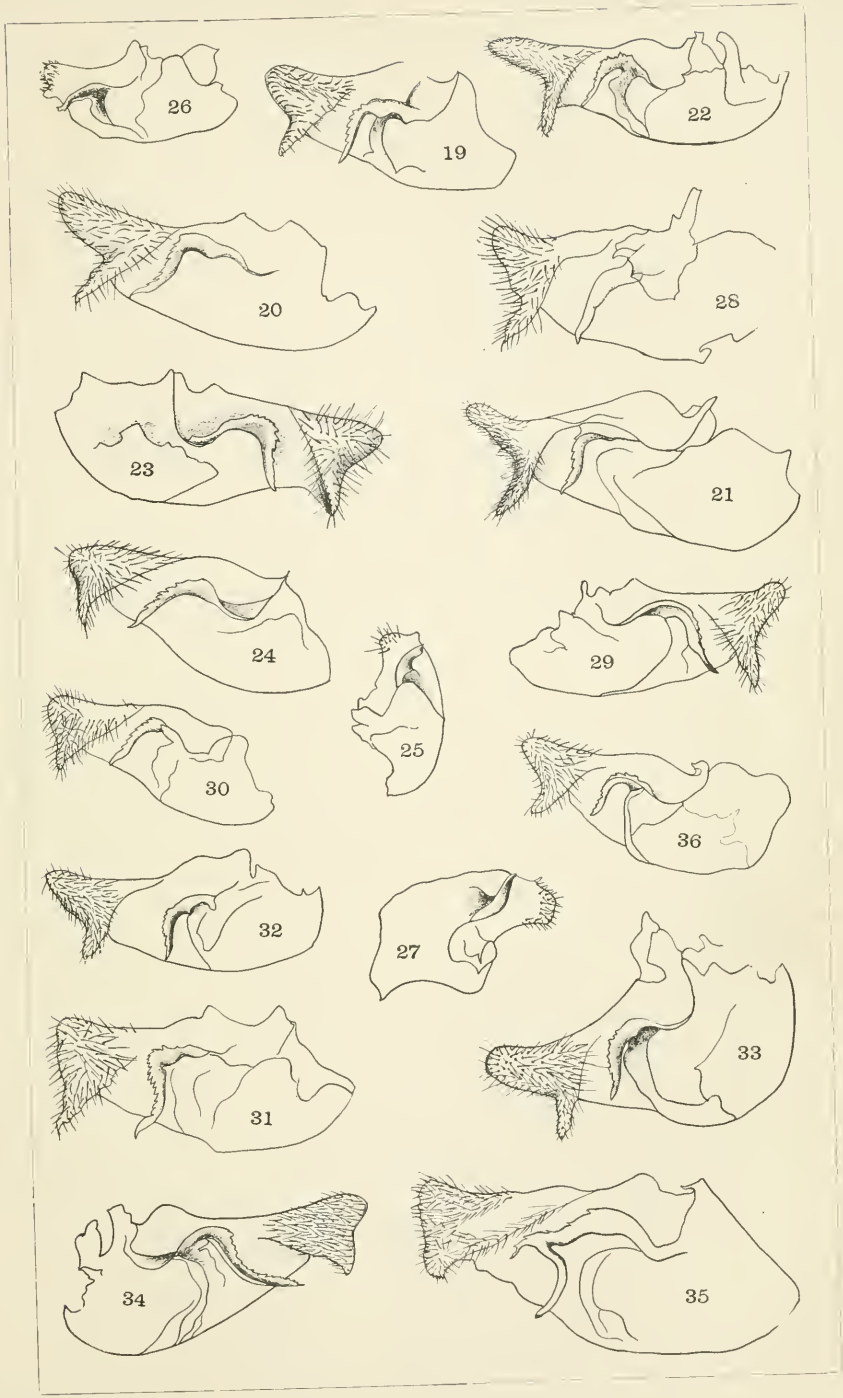
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CLASSIFICATION OF THE BEES, OR THE SUPERFAMILY APOIDEA.

BY WILLIAM H. ASHMEAD.

In the Journal of the New York Entomological Society, for March, 1899, I separated the Hymenoptera into ten superfamilies. The first of these or the Apoidea comprises the bees, among which, especially among the social bees, are to be found probably the highest or most specialized types in the order; hence my reason for beginning the classification of the Hymenoptera with these insects.

Our own bees, and indeed the bees of most countries, except those of the European fauna, are but little studied and very imperfectly known.

Thomas Say, Frederick Smith, Ezra T. Cresson, Charles Robertson, Abbe Provancher, Wm. J. Fox, T. D. A. Cockerell and a few others have done much towards making our species known, but there is still much to be done before we shall gain a knowledge of the immense number of species found in our vast country. Our study of them is just begun.

Prof. T. D. A. Cockerell's recent work on the bee fauna of the arid regions of New Mexico, Arizona, etc., illustrates well how little we really know of our bee fauna and what may be accomplished by one energetic student in the way of turning up new or undescribed species in a comparative limited area.

What Prof. Cockerell has done with the bee fauna of his part of the country could, I feel sure, be duplicated by energetic collectors and students in other parts of the country, since, I believe, we know scarcely twenty per cent of our indigenous species. There is, therefore, an immense unexplored field, offering the best opportunity for original work and discoveries, still opened to the student who will take up the study of our bees.

It is earnestly hoped, therefore, that the early publication of these tables will stimulate, aid and encourage our younger students to take up and study these neglected insects.

Before proceeding with my tables I desire briefly to call special attention to two most valuable works, treating upon the European bee fauna, which have appeared lately, and upon which much of my own work is based, viz.,

(1) Apidæ Europææ per genera, species et varietates dispositæ atque descriptæ a Dr. H. L. O. Schmiedeknecht. 1882–86.

(2) Die Bienen Europa's (Apidæ Europææ) nach ihren Gattungen, Arten und Varietäten auf vergleichend morphologisch-biologischer Grundlage bearbeitet von Heinrich Friese, 1895–97.

These books are most valuable and ought to be in the hands of all students who contemplate taking up the study of the bees. I have found them almost invaluable in my studies on the structure and affinities of this large complex group of insects.

It will also be observed that I have drawn quite largely upon Schmiedeknecht's work for ideas on the classification of these insects. In fact, minus a few slight changes, I have followed his ideas in extenso, as regards families, as may be readily seen by a comparison of my arrangement with his.

Dr. Schmiedeknecht, after giving an excellent historical review and resumé of the various schemes proposed for classifying these insects, during the past century or more, on page 11* of his work, proposed the following arrangement:—

Section I.—Apidæ sociales.
Section II.—Apidæ solitariæ, constructing cells.
Section III.—Apidæ parasiticæ.

Section I.

This section he has divided into two distinct families—*A* and *B*.

A.—Fam. I. Apidæ sens. str. Permanently social.—*Apis*.
B.—Fam. II. Bombidæ. Social but once a year.—*Bombus*.

Section II.

In this section Schmiedeknecht distinguishes three principal groups:

A.—Podilegidæ (Scopulipedes, leg collectors).
  a. Crurilegidæ (Tibia collectors).
  b. Femorilegidæ (Femur collectors).
B.—Gastrilegidæ (Dasygastræ, belly collectors).
C.—Pseudoparasitæ, *i. e.*, not furnished with an apparatus for collecting pollen, but yet not living parasitically.

Aa,—contains two families:
  Fam. III. Anthophoridæ.—*Anthophora, Habropoda, Sarapoda, Macrocera, Plistotrichia, Eucera, Melitturga, Systropha*.
  Fam. IV. Melittidæ.—*Cilissa, Macropis*.
Ab,—contains three families:
  Fam. V. Xylocopidæ.—*Xylocopa, Ceratina*.
  Fam. VI. Panurgidæ.—*Panurgus, Dasypoda, Panurginus, Camptobæum, Dufourea, Biareolina, Rhophites, Rhophitoides, Halictoides*.
  Fam. VII. Andrenidæ.—*Andrena, Colletes, Nomia, Nomioides*.

B,—contains but a single family:

Fam. VIII. Megachilidæ.—*Megachile, Chalicodoma, Lithurgus, Trachusa, Osmia. Heriades, Trypetes, Chelostoma, Anthidium.*

C,—contains two families:

Fam. IX. Sphecodidæ.—*Sphecodes.*

Fam. X. Prosopidæ.—*Prosopis.*

Section III.

This section he has divided into two groups:

A.—Inquilines or Commensales, *i. e.*, parasitic bees living in the nests of social species.

Fam. XI. Psithyridæ.—*Psithyrus* (= *Apathus*).

B.—True parasitic bees.

Fam. XII. Melectidæ.—*Melecta, Crocisa, Nomada, Epeolus, Epeoloides, Biastes, Pasites, Melittoxena, Ammobates, Ammobatoides.*

Fam. XIII. Stelididæ.—*Stelis, Cœlioxys, Dioxys.*

This arrangement of Dr. Schmiedeknecht's, and his separation of the old Apidæ into many well defined and readily recognizable families, I consider a decided improvement over all schemes of arrangement proposed by those who have preceded him, and will, I feel sure, in time meet with the hearty support and approval of all students of the bees.

Dr. Henry Friese, in his work, which is substantially a continuation of Schmiedeknecht's, follows closely the latter's arrangement, except that he treats his families as subfamilies, and has recognized 14 subfamilies in place of 13 families. This additional subfamily is made by separating from Schmiedeknecht's family Stelididæ, the genus *Cœlioxys* and others, which he calls the Cœlioxinæ.

Dr. Friese reverses the order of arrangement, proposed by Schmiedeknecht, and begins with the Prosopinæ or less specialized bees, and ends with the Apinæ, or the most highly specialized.

It is so nearly identical with Schmiedeknecht's arrangement as not to require a repetition here.

In the following pages it will be seen that I have in the main recognized most of the families, as proposed by Schmiedeknecht, but instead of thirteen I have fourteen, not entirely agreeing with either Schmiedeknecht nor Friese. How this is done may be readily discerned by an examination of my table of families, which is to follow.

Three or four of Schmiedeknecht's families I consider unnatural, or at least not equivalent to family rank, or to the rank of his other families, and two are suppressed. His family Sphecodidæ I have merged as a subfamily with the Andrenidæ, since it agrees in every

respect with many genera in this family, *Halictus* and allies, except that the pollen brush or flocculus is wanting on the hind femora, and thin and sparse, or scarcely noticeable on the hind tibiæ and tarsi.

It is not quite exact to say that the flocculus is wanting on hind legs in the Sphecodinæ, for it is really present, although much reduced, but yet sufficiently developed to retain pollen.

His family Melittidæ, containing only two genera, is also suppressed: *Cilissa* being placed with the Andrenidæ, *Macropis* with the Panurgidæ.

I also consider his family Melectidæ—my family Nomadidæ, in part (= subfamily Nomadinæ Friese)—a composite one; many of the genera he has placed in it, such as *Pasites*, *Melittoxena*, *Ammobates*, etc., not belonging to it, but, according to my views, should be placed with the Stelididæ. Their relationship to the Nomadidæ, if it ever existed, must be certainly very distant.

For the genus *Ceratina*, placed by Schmiedeknecht in his family Xylocopidæ, I have erected the family Ceratinidæ, since it seems to me to present scarcely any character in common.

The genus *Colletes*, Schmiedeknecht placed with the Andrenidæ. The Andrenidæ, as now restricted, will not permit this arrangement, since the mouth parts in *Colletes* are too entirely different from those of the genuine Andrenidæ. It is clearly related to the Prosopidæ, where Bingham (Fauna India Hymenoptera) and Friese have placed it.

It differs, however, in several particulars from *Prosopis* and allies. For instance, the front wings have three cubital cells, the head and thorax are densely pubescent, while the hind legs in the ♀ have a dense scopa, characters of great taxonomic importance (not possessed by *Prosopis*), and which seem to me to forbid its retention with the Prosopidæ.

There are several genera closely related to *Colletes*, having all the above characters in common, and for these I have retained the family name Colletidæ, first proposed by Col. Bingham.

In the arrangement of the families and genera in this work, I have attempted to bring together or in juxtaposition, such as have had seemingly a common origin or ancestry, or exhibit strong affinities. For I believe with Dr. Friese and others, that the commensals and parasitic bees are nothing more than offshoots from other bees, just as I believe and have already published, that the Ichneumonids are offshoots from plant-feeding wasps, Siricidæ, etc.; that the inqui-

linous and parasitic Cynipids are offshoots from the plant-feeding Cynipids, and that the parasitic Chacidids are offshoots from the plant-feeding Chalcidids, Agaonidæ, Eurytomidæ, etc.

This same kind of development or evolution is also found existing among the wood, sand and digger wasps: Masaridæ and Chrysididæ originated from the Vespidæ and Eumenidæ, while *Ceropales*, a genus in the Pompilidæ, living parasitically in the nests of other species of Pompilids, is an offshoot from *Pompilus*.

Among the bees, *Psithyrus* (= *Apathus*) is clearly an offshoot from *Bombus*, as Friese has shown.

The Nomadidæ evidently came directly from the Anthophoridæ and other pollen-gathering bees, while the Stelididæ for the most part had their origin among the Megachilidæ—the subfamily Stelidinæ coming from the Anthidiinæ, the Cœlioxinæ from the Megachilinæ, etc.

The Panurgidæ, or at least part of them, are of quite recent origin, some genera being evidently only recently evolved from *Andrena* and *Halictus*, while others seem to have come from the Anthophoridæ.

In our classificatory work I believe this law of evolution or development (for certainly evolution is no longer a theory, but a demonstrated law of the universe), should be borne in mind, and, as far as possible, the origin and affinities of the complexes, such as families, groups, genera, etc., should be interpreted and shown in our tables.

With this object in view, in the present work, therefore, I have not recognized the three sections of bees defined by Schmiedeknecht, since, to do so, would separate widely closely allied families; but instead I have interpolated, in my tables, the inquilinous and parasitic bees among the true honey-making bees, in order to demonstrate, what I conceive to be, their true affinities and relationship to each other.

The families into which the *Apoidea* are now divided may be separated by the use of the following table:

Superfamily I. Apoidea.

Table of Families.

Labium or tongue flattened, most frequently shorter than the mentum, rarely very much longer (some Panurgidæ); basal joints of labial palpi cylindrical, the first joint sometimes very elongate or thickened, but still neither flattened nor unlike the following..... .....6.

Labium or tongue very elongate, slender and always longer than the mentum; two basal joints of labial palpi very elongate, compressed, valvate and very unlike the following, which are minute, the third or fourth joint uniting with the second a little before its apex.

Hind tibiæ *with* two apical spurs.....2.

Hind tibiæ *without* apical spurs.

Sexes three, ♀, ♀, ♂; workers with corbiculæ. ♀ *without;* maxillary palpi very short, 1-jointed; labial palpi 4-jointed, with the joints very unequal, the first two long, valvately compressed....Fam. I. APIDÆ.

2. First submarginal cell not, or rarely, divided by a delicate, oblique nervure; if at all present, incomplete or indicated by a hyaline streak or nervure; sexes two, ♀, ♂; hind tibiæ in ♀ outwardly convex or rounded, never concave; no corbiculæ; basal joint of hind tarsi in ♀ not forcipate at base; malar space, except in Psithyridæ, wanting or indistict, never very large.....3.

First submarginal cell most frequently divided by a distinct, but delicate, oblique nervure, rarely indistinct; hind tibiæ and metatarsi in ♀ strongly dilated, outwardly concave (in a single case only convex, but this has a channel along the hind margin *Aglæ*); metatarsus in ♀ forcipate at base; malar space large, distinct.

Labrum transverse, subtrapezoidal, the clypeus not carinate; body densely hairy; scutellum semicircular, rounded off posteriorly and not projecting over the metanotum; sexes three, ♀, ♀, ♂; ♀ and ♀ *with* corbiculæ, and a dense polleniferous scopa on hind tibiæ and tarsi; labial palpi 4-jointed; maxillary palpi short, 2-jointed; tongue not extending beyond apex of thorax.....Fam. II. BOMBIDÆ.

Labrum large, subquadrangular, the clypeus, and most frequently the labrum also, carinate; body most frequently metallic, bare or only slightly pubescent, rarely very densely pubescent *Eulema;* scutellum large, quadrangular, projecting over the metanotum, the axillæ very small; sexes two, ♀, ♂, the ♀ with corbiculæ, but with the polleniferous scopa on hind tibiæ and tarsi very sparse and thin, and confined to the lateral edges; labial palpi 2-jointed; maxillary palpi 1-jointed; tongue reaching to or beyond the middle of abdomen.

Fam. III. EUGLOSSIDÆ.

3. Front wings with two submarginal cells.....5.

Front wings with three submarginal cells.

Eyes extending to or nearly to the base of the mandibles, the malar space wanting or at most not longer than the pedicel.....4.

Eyes not nearly extending to the base of the mandibles, the malar space large, distinct, longer than the pedicel and first joint of flagellum united.

Marginal cell very long, as long or longer than the three submarginal cells united; body rather densely pubescent; abdomen broadly oval or oblong, flat beneath, convex above; ♀ without a polleniferous scopa; ♂ with the eyes frequently strongly convergent above, the genitalia, squama and lacinia always membranous...Fam. IV. PSITHYRIDÆ.

4. Labrum large, free, convex or inflexed.

Marginal cell not especially long or narrow, rarely longer than the first two submarginal cells united.

♀ *with* a dense polleniferous scopa on hind tibiæ and tarsi; body clothed with a dense pubescence: maxillary palpi 2-6 jointed.

Fam. V. ANTHOPHORIDÆ.

♀ *without* a polleniferous scopa or at most with a thin, sparse flocculus on hind tibiæ; body most frequently bare or nearly; the pubescence, if any, short and sparse, rarely densely pubescent; species often metallic or rufous and black, the abdomen most frequently ornate, with white or yellow maculæ or bands.....Fam. VI. NOMADIDÆ.

Marginal cell long and narrow, usually as long or longer than the three submarginal cells united.

Hind tibiæ and tarsi with a sparse pubescense, but *without* a distinct scopa; maxillary palpi usually 6-jointed; body metallic or submetallic, nearly bare; abdomen elongate, subcylindrical, the segments more or less constricted at sutures. Small species.....Fam. VII. CERATINIDÆ.

Hind tibiæ and tarsi with a dense scopa; maxillary palpi 5-6-jointed, rarely wanting; thorax more or less densely pubescent, at least laterally; abdomen not elongate, with a scopa beneath: eyes in ♂ often strongly convergent above.....Fam. VIII. XYLOCOPIDÆ.

5. Labrum large and free, uncovered; maxillary palpi 4, 5 or 6-jointed (rarely wanting *Oxæa*): body densely pubescent, the hind legs with a dense scopa; ventral scopa present.

Marginal cell neither long nor narrow..Fam. V. ANTHOPHORIDÆ (pars).

Marginal cell very long and narrow....Fam. VIII. XYLOCOPIDÆ (pars).

Labrum not large and free, most frequently entirely covered by the clypeus (Megachilidæ), or, if somewhat visible, then strongly inflexed (*Stelididæ*).

Abdomen in ♀ *with* a ventral scopa; labrum entirely covered by the clypeus.

Fam. IX. MEGACHILIDÆ.

Abdomen in ♀ *without* a ventral scopa; labrum more or less visible, not entirely covered by the clypeus, strongly inflexed.

Fam. X. STELIDIDÆ.

6. Labium or tongue short, broad, obtuse or emarginate at apex, never acute medially; hind femora with or without a distinct golden brush or flocculus.....7.

Labium or tongue long or short, but always acute medially at apex; hind femora always with a pollen brush or flocculus, rarely very thin and sparse.

Front wings with two submarginal cells; labium or tongue long or short, usually, however, narrowed and longer than the mentum; labrum rather large, distinct, not covered by the clypeus, but most frequently inflexed.....Fam. XI. PANURGIDÆ.

Front wings with three submarginal cells; labium or tongue shorter or not longer than the mentum, triangular, not narrowed, rarely long; labrum not free, more or less hidden by the clypeus, or with basal processes always visible.....Fam. XII. ANDRENIDÆ.

7. Front wings with three submarginal cell; head and thorax more or less clothed with a dense pubescence; second recurrent nervure often more or less sinuate; lingua at apex rather deeply triangularly emarginate; hind femora in ♀ with a pollen brush or flocculus.

Fam. XIII. COLLETIDÆ.

Front wings with two submarginal cells; head and thorax bare or nearly; second recurrent nervure always straight; lingua very short and broad, shallowly or very obtusely triangularly emarginate at apex; hind femora without a pollen brush or flocculus.

Fam. XIV. PROSOPIDÆ.

Family I. APIDÆ.

To this family, as here restricted, belong all the genuine honey-making social bees, living in large communities and consisting of three sexes, females (or queens), workers and males. Here belong the common hive-bee, the domesticated bees of various countries and the stingless bees of subtropical and tropical regions.

The family is at once distinguished from all the other families of bees by the total absence of apical spurs on the hind tibiæ, by the venation of the front wings, and by the workers being furnished with corbiculæ. This last character is absent in all other bees, except in the Bombidæ and Euglossidæ, which, however, are large, robust bees, with two apical spurs on the hind tibiæ, while the venation of the front wings is quite different.

Two subfamilies have been recognized, distinguished as follows:

Table of Subfamilies.

Front wings with two (rarely three) distinct cubital cells, the marginal cell lanceolate, slightly open at apex; stigma lanceolate or narrow ovate; eyes bare, extending to base of mandibles; ♀ and ☿ without a sting, but both with corbiculæ.....Subfamily I. MELIPONINÆ.

Front wings with three distinct cubital cells, the marginal cell rounded and closed at apex; eyes hairy, not extending to base of mandibles; ♀ and ☿ with a sting, ♂ only with corbiculæ; eyes in ♂ holoptic.

Subfamily II. APINÆ.

Subfamily I. MELIPONINÆ.

(The Stingless Honey-bees).

This subfamily is readily distinguished from the common honey or hive-bees by the venation of the front wings, the bare eyes, which extend to the base of the mandibles, the ♀ and ☿ being without a sting, and by the *simple* not cleft claws.

Three genera have been recognized, only two of which are known to me, *Melipona* and *Trigona*. Some authors would unite both under the older name *Melipona*, but since they are readily separable, I believe it best to retain both genera.

Table of Genera.

Thorax rather densely pubescent; mandibles broad, without teeth, the apex broad and blunt; stigma in front wings lanceolate.

Abdomen not small, convex above, the venter rounded, not carinate, with a distinct scopa..... .....**Melipona** Illiger.

Thorax and abdomen bare or almost bare; mandibles broad, but with teeth, or at least with one or two small teeth at inner apical angles; stigma in front wings subovate or ovate-lanceolate.

Abdomen small, short, triangular, carinate beneath.....**Trigona** Jurine.

Abdomen elongate, almost quadrangular, the dorsum forming an obtuse angle. **Tetragona** Seville et. Lepel.

Subfamily II. APINÆ.

(The Hive or true Honey-bees).

To this family belong the true honey-bees, the hive bee and the various domesticated bees of different countries—the Italian bee, the Egyptian bee, the bee of India, etc. They differ in several ways from the Meliponinæ; the ♀ and ☿ always possess a sting, the eyes are hairy and do not quite extend to the base of the mandibles, while the front wings have three distinct cubital cells, and the marginal cell is long and always closed and rounded at apex, quite different from that of the Meliponinæ. They also differ in having cleft, not simple, claws.

This family is represented by a single genus, *Apis* Linné, readily recognized by the characters given in my table of subfamilies.

Family II. BOMBIDÆ.

(The Bumble or Humble Bees).

The bees belonging to this family comprise median to large sized robust bees, clothed with a dense, more or less velvety-like pubescence, and known to us under the name of bumble or humble bees. In their habits they agree with the Apidæ, being social and living in large communities, each species being composed of three kinds of individuals—males, females and workers, the latter being sometimes called neuters or nurses

Only a single genus is known, distinguished as follows:

♀ and ☿ with the posterior tibiæ dorsally depressed, polished and furnished with corbiculæ, posterior tarsi with the first joint angulated above forming a forcipate hook externally.

♂ with the posterior tibiæ above more or less shining, somewhat concave; genitalia, squama and lacinia corneous.....**Bombus** Fabr.

Family III. EUGLOSSIDÆ.

This family is erected to contain two genera of bees found in Mexico, Central and South America, viz., *Euglossa* and *Eulema*, usually placed with the Anthophoridæ, but which clearly, on account of the character of the hind legs, are not at all related to them, but show a closer affinity with *Bombus*, *Apis* and *Melipona*.

Table of Genera.

Marginal cell at apex narrowly rounded, always separated from the costa; second and third submarginal cells each receiving a recurrent nervure, cubital cells, along the cubitus, nearly equal, or the second is sometimes the shortest or smallest.

Third cubital cell, along the cubitus, fully as long or distinctly longer than either the first or second; thorax and abdomen clothed with a short dense pubescence.....2.

Third cubital cell, along the cubitus, scarcely as long as the first, the second clearly smaller than either the first or third; body strongly metallic bare or nearly.

Labrum and clypeus tricarinate; scutellum large, semicircular, with a median depressed line posteriorly, which, in ♀, is frequently filled with a cleft of black hairs.....**Euglossa** Latr.

2. Labrum and clypeus tricarinate; scutellum large, quadrangular, flat, the lateral margins slightly reflexed, the ♀ usually with a tuft of black pubescence medially, as in *Euglossa;* maxillary palpi 1-jointed, compressed.....**Eulema** Lepel.

Family IV. PSITHYRIDÆ.

(The Falsa Bumblee-Bee).

This family is monogenetic and comprises *Bombus*-like parasitic bees, easily and often confused with the genuine bumble or humble bees, their external structural characters being almost essentially the same. The following characters will, however, readily distinguish them:

♀ *without* corbiculæ, with the hind tibiæ dorsally convex and densely pilose; hind tarsi not forcipate at base; anus inflexed; ♂ with the hind tibiæ equally pilose, the genitalia, squama and lacinia always membranous.....**Psithyrus** Lepeletier.

Family V. ANTHOPHORIDÆ.

This is probably the most extensive family among the bees, and is found widely distributed over the entire globe. Unlike the honey-bees and the bumble bees, all the species are solitary in their habits and consist of but two sexes—a ♂ and a ♀.

The following table will enable the student to determine the genera at present recognized:

Table of Genera.

Front wings with two cubital cells.....20.
Front wings with three cubital cells.

Cubital cells, along the cubitus, with one or another of the cells much longer or much shorter than another.....3.

Cubital cells, along the cubitus, more nearly equal, none very much longer or shorter than another; the first is most frequently the longest, or the second or third is sometimes the longest.....6.

3. Third submarginal cell, along the cubitus, longer than the first, or at least of an equal length.....4.

Third submarginal cell, along the cubitus, equal to the first or very much shorter.....5.

4. Second cubital cell, along the cubitus, distinctly shorter than the first or third, the third nearly as long as the first, or a little longer and much narrowed above, rarely are the first and second subequal, the second being most frequently much shorter than either the first or third, quadrangular or wider than long.....17.

Second cubital cell, along the cubitus, somewhat longer than either the first or third; first discoidal cell about equal in length with the marginal cell; clypeus smooth; first recurrent nervure received by the second at or a little before its middle.

Thorax clothed with a dense pubescence, the abdomen more or less bare, except at base; marginal cell rather short, obtuse or rounded, the third cubital cell much narrowed above; hind legs in ♀ with a long, dense scopa; mandibles 3-4 dentate.....**Centris** Fabr.

5. Third cubital cell much narrowed above, the third transverse cubitus angulated or strongly curved inwardly before uniting with the radius..10.

Third submarginal cell not or scarcely narrowed above, the third transverse cubitus nearly straight or only slightly curved outwardly; the third submarginal cell along the radius, therefore, as long as, or nearly as long as, along the cubitus.

Third cubital cell, along the cubitus, never longer than the first, most frequently smaller or shorter, quadrate or nearly.....6.

6. Third cubital cell not nearly quadrate, much narrowed above.....13.

Third cubital cell quadrate or nearly, never much narrowed above; first cubital cell, along the cubitus, a little longer than the second or distinctly longer.

Second cubital cell quadrate or nearly, distinctly shorter and smaller than the third, or then wider (higher) than long, or trapezoidal; clypeus in ♂ yellow; maxillary palpi 6-jointed.....9.

Second and third cubital cells, along the cubitus, equal or very nearly, fully as long or longer than wide.

Clypeus in ♀ black, in ♂ yellow; maxillary palpi 5 or 6-jointed; abdomen sometimes with pale fasciæ; first recurrent nervure received by the second near or a little beyond its middle; first discoidal cell much longer than the marginal.....7.

Clypeus in both sexes yellow; maxillary palpi 4-jointed; abdomen with yellow fasciæ or narrowly fasciate with white hairs.

Saropoda Latreille.

7. Mandibles at apex bluntly rounded, truncate, or at most bidentate; labial palpi 4-jointed.....8.

Mandibles in both sexes tridentate; labial palpi 4-jointed; first recurrent received by the second cubital cell a little beyond its middle, the second cubital slightly narrowed above.....**Clisodon** Patton.

8. First recurrent nervure received by the second cubital cell at or a little beyond its middle (rarely a little before); front coxæ in ♂ normal, unarmed.

Abdomen black, sometimes banded or fasciate; maxillary palpi 6-jointed.

Malar space more or less distinct, but narrowed, not or scarcely as long as the second flagellum joint; transverse median nervure straight; first recurrent nervure received by the second cubital cell a little beyond its middle; abdomen without distinct fasciæ, bare, or with the segments 1–4 densely pubescent.

Anthophora Latreille = *Podalarius* Latr.

Malar space wanting, the eyes extending fully to the base of the mandibles.

Dorsal abdominal segments with large, white, hairy maculæ laterally.

Paramegilla Friese.

Dorsal abdominal segments *without* such maculæ, apically banded with ivory-white bands, or with pubescent fasciæ, or the whole abdomen is quite densely pubescent.....**Amegilla** Friese.

Abdomen yellow or ferruginous, banded or maculate with black; maxillary palpi 5 or 6-jointed.

Abdomen ferruginous, the dorsal segments 1–4 with an oblong black spot on each side; maxillary palpi 6-jointed; mandibles dentate.

Lagobata Smith.

Abdomen yellow, banded with black; maxillary palpi 5-jointed; claws cleft.....**Euthyglossa** Radoszk.

First recurrent nervure interstitial with the second transverse cubitus; front coxæ in ♂ armed with a long spine, the basal joint of the anterior and posterior tarsi much dilated; maxillary palpi long, 6-jointed, the first joint very short, the second the longest, as long as 4–6 united.

Habropoda Smith

9. First recurrent nervure almost interstitial with the second transverse cubitus; basal joint of hind tarsi in ♂ normal.

Second cubital cell almost quadrate, distinctly shorter than the third, the latter along the radius being about one-third shorter than along the cubitus; abdomen *without* fasciæ.....**Emphoropsis** Ashm. n. g.

First recurrent nervure received by the second cubital near its middle, the second recurrent received by the third cubital cell, either near its middle or near its apex; basal joint of hind tarsi in ♂ long, curved.

Second cubital cell trapezoidal, wider (higher) than long, but about twice as long along the cubitus as along the radius; abdomen not fasciate.

Emphor Patton.

10. Stigma distinctly developed, although never very long, but at least twice as long as wide.....22.

Stigma very small, short, not longer than wide or subobsolete, never well developed (except in *Diadasia*); radial cell at apex remote from costa.

Submedian cell never much shorter than the median, equal or very nearly.....11.

Submedian cell much shorter than the median.....15.

11. First discoidal cell fully as long or distinctly longer than the marginal cell.
Basal joint of hind tarsi in ♂ normal, not curved, in ♀ produced at apex beyond the insertion of the second joint; flagellum not depressed..12.
Basal joint of hind tarsi in ♂ very long and curved or simply bent; flagellum in ♀ subdepressed; first recurrent nervure joining the second cubital cell near its middle, the second recurrent received by the third, either near its middle or beyond near its apex
Second cubital cell trapezoidal wider (higher) than long, but twice as long along the cubitus as along the radius; abdomen not fasciate.
Emphor Patton
12. Head rather large, the ocelli arranged in a transverse line; mandibles at apex bidentate; abdomen in ♀ 5-segmented, in ♂ 6-segmented; hind tibiæ without a knee plate; claws bifid.....**Monœca** Latr.
Head normal, the ocelli arranged in an obtuse triangle, or on a slight curved line; mandibles at apex simple or bidentate.
Second cubital cell, along the cubitus, distinctly shorter than the first or third.....14.
Second cubital cell, along the cubitus, as long or very nearly as long as the first, both being considerable longer than third .....16.
13. Cubital cells, along the cubitus, about equal or subequal, the third along the radius only half as long as along the cubitus.
Second cubital cell a little larger than either the first or third, and along the radius longer than along the cubitus; first recurrent nervure received by the second before the middle; mandibles 3–4 dentate.
Centris Fabr.
Second cubital cell not larger than the first or second, usually a little shorter, and along the radius not longer than along the cubitus, usually shorter; first recurrent nervure received by the second cubital cell far beyond the middle, or interstitial with the second transverse cubitus; mandibles edentate, or at most bidentate at apex.
Abdomen in ♀ with 5 dorsal segments, not fasciate; antennæ filiform; claws simple.....**Epicolpus** Spin.
Abdomen in ♀ with 6 dorsal segments, fasciate or subfasciate; claws cleft; maxillary palpi 5-jointed; clypeus in ♂ yellow, the antennæ very long.....**Tetralonia** Spin.
14. Abdomen in ♀ with 6, in ♂ with 7 dorsal segments; antennæ in ♀ not long, subcompressed at apex, in ♂ very long; hind tibial spurs normal; claws cleft.
Maxillary palpi 6-jointed; second cubital cell quadrate or nearly, scarcely narrowed above, the first recurrent nervure received at its apical fourth.....**Synhalonia** Patton.
Maxillary palpi 5-jointed.
First recurrent nervure received by the second cubital cell at its extreme apex, or very nearly interstitial with the second transverse cubitus, the second cubital cell longer than wide; thorax clothed with a whitish or cinereous pubescence; abdomen fasciate.
Tetraloniella Ashm. n. g. (Type *T. graga* Everm.).
First recurrent nervure received by the second cubital cell only a little beyond its middle, or at most at its apical third, the second cubital cell quadrate or a little wider (higher) than long; thorax clothed with a fulvous pubescence.....**Xenoglossa** Smith

Maxillary palpi 4-jointed, the first and last joints very short, minute, scarcely longer than thick; second cubital cell quadrangular, longer than wide, the first recurrent received at about its apical fourth.

Melissodes Latr. (pars).

15. Marginal cell at apex broadly truncate, with an appendage.

First cubital cell, along the cubitus, not longer than the second, the latter somewhat narrowed above, and receiving the first recurrent nervure at its extreme apex, or just before the second transverse cubitus; third cubital cell a little the longest cell; first discoidal cell shorter than the marginal; dorsal abdominal segments broadly and sharply depressed at apex, the depressed portion being differently sculptured from the basal portion; no fasciæ on segments; pygidial plate subtriangular, rounded at apex; claws in ♀ simple, in ♂ cleft; clypeus yellow in both sexes; mandibles bidentate; eyes in ♂ convergent above, the face narrowed; flagellum subclavate, the first joint of flagellum very long.....**Melitnrga** Latr.

First cubital cell, along the cubitus, longer than the second, the latter quadrate, receiving the first recurrent nervure at its middle; legs densely hairy, the middle tibial spur simple; knee plate on hind tibiæ wanting; claws cleft.....**Melitoma** Latr.

16. Second cubital cell wider (higher) than long.....19.

Second cubital cell as long or longer than wide.

First and second cubital cells, along the cubitus, of an equal length or nearly, the third distinctly shorter and smaller than the others; first recurrent nervure received by the second cubital cell a little beyond its middle; clypeus prominent, bicarinate, the carinæ convergent posteriorly; mandibles at apex tridentate; maxillary palpi very short, 2-jointed, the first joint short.

Epicharis Klug ? = *Melissoptila* Holmb.

17. Clypeus in ♂ not pale or yellow, at most and very rarely, with a pale stripe; antennæ in ♂ not or very little longer than in the ♀; maxillary palpi 4–6 jointed.....21.

Clypeus in ♂ more or less yellow (rarely black), in ♀ black; antennæ *in* ♂ *very much longer than in the* ♀ or deformed; maxillary palpi 3, 4, 5–6 jointed.....18.

Clypeus in both sexes yellow or white; *antennæ short and much alike in both sexes;* recurrent nervures received respectively by the second and third cubital cells a little before the first and second cubiti.

Marginal cell at apex broadly obliquely truncate; dorsal abdominal segments broadly, sharply depressed at apex, the depressed part differently sculptured from the basal portion; claws in ♀ simple, in ♂ cleft; eyes in ♂ convergent above; mandibles bidentate; flagellum subclavate.....**Melitnrga** Latr.

Marginal cell at apex not truncate, narrowly rounded, or somewhat pointed; dorsal abdominal segments at apex not depressed, uniformly sculptured; claws cleft in both sexes; eyes in ♂ not convergent above; mandibles simple; flagellum filiform.....**Melitnrgopsis** Ashm. n. g.

18. First and second cubital cells, along the cubitus, equal or nearly, considerably longer than wide, but shorter than the third; first recurrent nervure

received by the second cubital cell beyond the middle; mandibles at apex bluntly rounded, edentate; maxillary palpi 3-jointed.

Epimelissodes Ashm. n. g. (Type *M. atripes* Cr.).

First and third cubital cells, along the cubitus, subequal, the second smaller or shorter than either the first or third, the third the longest.

First recurrent nervure received by the second cubital cell at or near its middle or beyond the middle, the second recurrent received by the third cubital cell near its apex or almost interstitial with it; third transverse cubitus not strongly angulately bent, the knee formed by the curvature of the vein towards the radius rounded.

Maxillary palpi 6-jointed; submedian and median cells equal; abdomen in ♀ black, not fasciate.....**Synhalonia** Patton.

Maxillary palpi 5-jointed; submedian cell a little shorter than the median.

Xenogloss Smith.

Maxillary palpi 4-jointed; abdomen fasciate or subfasciate (rarely without).....**Melissodes** Latr.

First recurrent nervure received by the second cubital cell *much beyond its middle* or its apex, the second recurrent received by the third cubital cell just in front of the third transverse cubitus (only interstitial); third transverse cubitus strongly angulated or bent, its upper half or more bent inwardly towards the radius, so that the third cubital cell along the radius is only one-half as long (or even less) than along the cubitus; first discoidal cell not longer than the marginal cell, most frequently somewhat shorter.

Maxillary palpi 6-jointed; abdomen in ♂ not fasciate, in ♀ fasciate; submedian cell a little shorter than the median.

Eusynhalonia Ashm. n. g. (Type *S. Edwardsii* Cr.).

Maxillary palpi 5-jointed, the last two joints united, scarcely longer than the third, first and second joints subequal, much longer than the third; submedian cell very distinctly shorter than the median; second cubital cell quadrangular, longer than wide, but shorter than the first or third; abdomen fasciate, or in ♀ clothed with a fine, short, whitish or pruinose pubescence.

Xenoglossodes Ashm. n. g. (Type *X. albata* Cr.).

Maxillary palpi 4-jointed: scopa on hind legs in ♀ long and densely plumose; antennæ in ♂ longer than the thorax, the clypeus yellow (rarely black).

Maxillary palpi with all the joints slender, the second and third elongate, the first and fourth very short; abdomen fasciate.**Melissodes** Latr.

Maxillary palpi with the first joint enlarged, thickened, nearly as long as 2-4 united, the following slenderer, the second about as long as 3-4 united.....**Eplectica** Holmberg.

19. First and third cubital cells, along the cubitus, about of an equal length or nearly, the second much smaller, wider (higher) than long; transverse median nervure interstitial or nearly, at most uniting with the median vein just in front of the basal nervure; maxillary palpi 6-jointed..21.

20. First and second cubital cells subequal, the second a little the longer; basal depression on first abdominal segment bounded superiorly by a distinct transverse carina; hind tibiæ in ♀ with a dense scopa; antennæ in ♂ very long, much longer than in ♀, the clypeus yellow, maxillary palpi 5-jointed.....**Eucera** Scopoli = *Anthophorula* Ckll.

21. Stigma more or less developed, at least twice as long as wide.

Abdomen smooth, polished, or microscopically reticulated, with hair bands, the venter with a long, sparse pubescence; hind legs in ♀ with rather long, sparse, black scopa, but conspicuously plunose; tongue much elongate, extending to apex of the first abdominal segment; maxillary palpi with joints 1-2 of an equal length; first joint of labial palpi scarcely half the length of the second ciliated; basal joint of hind tarsi in ♂ long, slightly curved, but not produced into a process beyond the insertion of the second joint.....**Entechnia** Patton.

Abdomen rarely polished, densely pubescent and usually fasciate, the venter with a long, dense pubescence; hind legs in ♀ with a long, dense, whitish, griseous or yellowish scopa; tongue not greatly lengthened; joints 2 and 3 of maxillary palpi almost twice as long as the first; first joint of labial palpi longer than the second; basal joint of hind tarsi in ♂ very long, strongly curved and produced into a long process beyond the insertion of the second joint.

Ancyloscelis Latr. = *Diadasia* Patton.

22. Second submarginal cell, along the cubitus, longer than wide.....23.

Second submarginal cell, along the cubitus, wider (higher) than long and scarcely half the length of the first.

Transverse median nervure not interstitial, but joining the median vein a little beyond the origin of the basal nervure; first recurrent nervure interstitial or nearly with the second transverse cubitus; second recurrent nervure received by the third cubital cell at its apex or just before the third transverse cubitus; hind tibiæ with a long, dense scopa; maxillary palpi 6-jointed; labial palpi 4-jointed.

Exomalopsis Spinola.

23. First recurrent nervure received by the second cubital cell a little *before* its middle, the second recurrent received by the third near its apex; maxillary palpi 6-jointed; labial palpi ? 2-jointed.

Tetrapædia Klug.

First recurrent nervure received by the second cubital cell distinctly beyond its middle, or near its apex, nearly interstitial with the second transverse cubitus; second recurrent nervure almost interstitial with the third transverse cubitus; basal depression of first segment bounded by a transverse carina superiorly; maxillary palpi 6-jointed, joints 1-4 subequal in length, 2-6 shorter; clypeus in male yellow.

Diadasiella Ashm. n. g. (Type *D. coquilletti* Ashm.).

Family VI NOMADIDÆ.

(The Cuckoo Bees).

To this family belong the cuckoo or parasitic bees, with three submarginal cells in the front wings. Most of the species are bright colored or metallic-blue or green, with the abdomen most frequently marked with white pubescent maculæ, banded, or ornate with yellow or white.

All, without exception, live parasitically in the nests of other bees,

and have undoubtedly originated from other bees, through different lines of descent. It is evident, however, that most of them are descendents from various Anthophorid bees, since they agree more nearly with these bees in venation and the characters of the mouth parts than with any of the others.

They are easily distinguished from the Anthophoridæ, however, by color, by the ♀ having no polleniferous scopa, or at most with only a very short, sparse pubescence, and by their bodies being most frequently bare or nearly, the pubescence, if any, being short and sparse. Very rarely are they densely pubescent on the head and thorax, as in the Anthophoridæ. The species are metallic, or rufous and black, or rufous and yellow, the abdomen being most frequently ornate with yellow or white maculæ or bands.

Some of them also resemble quite closely some of the Stelididæ, another family of parasitic bees; but the latter have only two submarginal or cubital cells in the front wings, while the labrum is, as a rule, not so well developed nor so prominent and always strongly inflexed. I believe also that the Stelididæ had quite a different line of descent, or from the Megachilidæ, their characters agreeing more nearly with this family than with any other.

The numerous genera, now placed in the Nomadidæ, may be distinguished by the use of the following table:

Table of Genera.

Marginal cell at apex not separated from the costa.....17.
Marginal cell at apex rounded, always separated from the costa or truncate.
Cubital cells, along the cubitus, nearly of an equal length, the first as a rule somewhat the longest cell.....14.
Cubital cells, along the cubitus, of an unequal length, one or another most frequently longer or much smaller, the first usually much the longest, or at least somewhat the longest (very rarely with the third the longest).
Third cubital cell, along the cubitus, longer than either the first or second.....13.
Third cubital cell, along the cubitus, equal to the first or distinctly shorter.....2.
2. First cubital cell, along the cubitus, much longer than the third, sometimes as long as the second and third united.....3.
First cubital cell, along the cubitus, equal or nearly equal to the third, never very much longer.
Second cubital cell either petiolate or very much narrowed above; marginal cell elliptical, not or only a little longer than the first cubital cell, or less than half the length of the first discoidal cell; scutellum subbilobed; axillæ rounded behind; abdomen short, subglobose as viewed from above; labial palpi 3-jointed, the first joint stout, longer than 2 3 united; claws with a tooth or cleft.....**Zacosmia** Ashm.

Second cubital cell quadrate or trapezoidal, as long as the first or third, conical, banded or marked with white pubescence; maxillary and labial palpi 4-jointed.....**Leiopodus** Smith.

3. Second cubital cell, along the cubitus, shorter than either the first or third, or the second and third are equal or nearly.

Third cubital cell, *along the radius*, much shorter than along the cubitus, being narrowed above.....16.

Third cubital cell, *along the radius*, as long as along the cubitus, not narrower above than below.....4.

4. First cubital cell, along the cubitus, much shorter than the second and third..9.

First cubital cell, along the cubitus, as long as the second and third united or nearly.

Third transverse cubitus angularly broken, not strongly curved outwardly..8.

Third transverse cubitus not angularly broken, strongly curved outwardly..5.

5. Submedian cell somewhat longer than the median, but the transverse median nervure is straight, oblique or only slightly bent, but not angulated..7.

Submedian cell much longer than the median, the transverse median nervure strongly angulated or > shaped.....6.

6. Body black, the thorax densely pubescent, with griseous or pale fulvous hairs above.

Abdomen black, immaculate; scutellum broad, the axillæ produced posteriorly into long, acute teeth or spines, the postscutellum unarmed.

Bombomelecta Patton.

Abdomen black, shining, but the dorsum with maculæ of white pubescence laterally; scutellum somewhat convex, scarcely bilobed, the postscutellum armed with a spine or tooth, the axillæ normal, unarmed; maxillary palpi 5-jointed; labial palpi 4-jointed.....**Melecta** Latr.

Body rufous or rufous and black, bare or nearly; scutellum bilobed, the axillæ triangularly acute at apex, but neither long nor extending beyond the hind margin of the middle lobe.

Pyrrhomelecta Ashm. n. g. (Type *Epeolus glabrata* Cr.).

Body black, the thorax almost bare above, the abdomen dorsally banded with white or with white lateral maculæ; axillæ triangular; scutellum proper (middle lobe) very large, flat, quadrangular and extending over the metathorax, the hind margin sinuate; labial palpi 2-jointed; maxillary palpi 5-jointed.....**Crocisa** Latr.

7. Third cubital cell not narrowed above, the marginal cell not longer than half the length of the first discoidal cell.

Scutellum bilobed, each lobe with a short conical tooth on its disk; axillæ normal; postscutellum unarmed; labial palpi 5-jointed; maxillary palpi 4-jointed, the last joint minute...**Pseudomelecta** Radoszk.

Scutellum terminating in two pointed tubercles; axillæ produced posteriorly into acute incurved spines; postscutellum unarmed; labial palpi 4-jointed; maxillary palpi 2-jointed, the basal joint minute globose.

Thalestria Smith.

Third cubital cell narrowed above, being much shorter along the radius than along the cubitus, the marginal cell longer than half the length of the first discoidal; labial palpi 2-jointed.

Metathoracic angles densely pubescent; transverse median nervure not angulate; scutellum bilobed.....**Erierocis** Cress.

Metathoracic angle bare or with a very short appressed pubescence; transverse median nervure angulate; scutellum convex, with a very slight median depression posteriorly, or at most sub-bilobed; axillæ triangular, blunt behind..... **Epeolus** Latr.

8. Mandibles simple; abdomen with transverse bands.
   Free portion of the marginal cell much less than that occupied by the cubitals..... **Dœringiella** Holmberg.
   Free portion of the marginal cell much greater than that occupied by the cubitals; second cubital cell subtriangular; maxillary and labial palpi as in *Dœringiella*..... **Trophocleptria** Holmberg.
9. First recurrent nervure not interstitial with the second transverse cubitus, but joining the second cubital cell *before* or *beyond* the middle.....11.
   First recurrent nervure interstitial with the second transverse cubitus.
   First and second cubital cells, along the cubitus, of an equal length or nearly, the second sometimes a little the longer; labial palpi 4-jointed....10.
   First cubital cell, along the cubitus, longer than the second, the latter hardly so long as the third; scutellum normal; maxillary palpi 4-jointed.
   Rhathymus Lepel. = *Liogaster* Perty.
10. Second cubital cell, *along the cubitus*, twice as long as the third, the latter wider than long; scutellum bituberculate; maxillary palpi 1-jointed, with an annulus at base..... **Eurytis** Smith = *Hopliphora* Lepel.
    Second cubital cell, *along the cubitus*, rarely much longer than the third; scutellum bilobed; maxillary palpi 3-jointed..... **Melissa** Smith.
11. First recurrent nervure joining the second cubital cell *at* or *before* the middle..12.
    First recurrent nervure joining the second cubital cell *beyond* the middle.
    Scutellum simple, rounded posteriorly; mandibles bidentate; maxillary palpi 4-jointed; labial palpi 2-jointed..... **Melectoides** Taschenb.
    Scutellum bituberculate.
    Second cubital cell smaller than the third, both a little narrowed above, the second along the radius scarcely two-thirds the length of the third; tibial spurs simple..... **Mesocheira** Lepel.
    Second cubital cell longer than either the first or third, oblong-quadrate, the third petiolate; hind tibial spurs simple; maxillary palpi 6-jointed; labial palpi 4-jointed..... **Mesonychium** Lepel.
    Scutellum distinctly bidentate.
    Second cubital cell almost quadrate, a little smaller than the third; middle tibiæ with one spur, its apex bifid, the posterior tibial spurs serrate within..... **Mesocheira** Lepel.
12. Marginal cell separated from the costa its entire length; second recurrent nervure interstitial with the second transverse cubitus; maxillary palpi 6-jointed; labial palpi 4-jointed..... **Florentina** D. T.
    Marginal cell separated from the costa only towards the apex; second recurrent nervure not interstitial.
    Labrum longer than wide.
    Maxillary palpi wanting; labial palpi appearing as a single long bristle; mandibles bidentate.. **Exærete** Hoffmansegg = *Chrysantheda* Perty.
    Maxillary palpi 2-jointed; second cubital cell trapezoidal; scutellum normal, subconvex..... **Epeicharis** Radoszk.
    Maxillary palpi 3-jointed; second cubital cell quadrate; scutellum elevated..... **Epicharoides** Radosz.

Labrum wider than long.

Maxillary palpi 6-jointed; second cubital cell shorter than the third; scutellum not elevated; mandibles bidentate.....**Epeoloides** Girard.

13 Second and third cubital cells each receiving a recurrent nervure.....16.

Third cubital cell receiving both recurrent nervures; middle tibial spur dilated and serrated ♀.....**Acanthopus** Klug.

14. Third cubital cell receiving both recurrent nervures; antennæ very long, longer than the body ♂.

Acanthopus Klug. = *Ctenioschelus* De Roman.

Second and third cubital cells each receiving a recurrent nervure.

Metallic bluish green species; clypeus with a median depression, but not bounded by distinct carinæ laterally; the clypeus itself, however, laterally before its apex has a carina, which curves towards the base of the eyes; scutellum large, with a ridge or elevation at sides; maxillary palpi 2-jointed; labial palpi 4 jointed.....**Aglæ** Lepel.

15. First and second cubital cells subequal, shorter than the third, the second trapezoidal; non-metallic species.

Labrum normal, without a median depression, yellow; clypeus and abdomen yellow, the latter banded with black; antennæ in ♂ deformed, the scape very stout, the flagellum subcylindrical, tapering towards apex, the last joint produced into a curved spine, as in *Alcidamea* Cr.; hind femora much swollen.

Cænonomada Ashm. n. g. (Type *C. Bruneri* Ashm.).

16. Second and third cubital cell, along the cubitus, about equal, shorter than the first; second cubital cell quadrate.

Abdomen normal, neither lengthened nor narrowed; hind femora, with a tooth beneath; maxillary palpi 6-jointed; labial palpi 4-jointed.

Lipotriches Gerst.

Abdomen much lengthened and narrowed; ♀ with the terminal ventral segment much produced, forming an elongate receptable for the base of the sting, which is greatly exserted; hind femora simple.

Osiris Smith.

17. Marginal cell not quite as long as the three cubital cells united, narrowly rounded at apex, and with a slight appendage; second cubital cell quadrate, half the length of the first; first recurrent nervure joining the second cubital cell near its apex, the second recurrent joining the third beyond its middle; scutellum large, transverse quadrate greatly produced and extending over the metathorax, similar to *Crocisa*, depressed above, with its apical margin medially triangularly emarginate; abdomen as in *Crocisa*, with oblong, pearly white spots at the apical angles of the dorsal segments; tongue long, densely pilose (Africa).....**Crocisaspidia** Ashm. n. g. (Type *C. chandleri* Ashm.).

Marginal cell as long as the three cubital cells united, well rounded at apex; third cubital cell oblong-quadrate, almost as long as the first and second united, the second cubital—the smallest cell—scarcely half as long as the third and narrowed above; first recurrent nervure joining the second cubital cell a little beyond the middle, the second recurrent joining the third at its middle; scutellum large, quadrate, with a tubercle on each side at base; abdomen narrow, acutely conical, the last ventral segment produced much as in *Osiris*.

Cœlioxoides Cress.

18. Submedian cell distinctly longer than the median; maxillary palpi 6-jointed.
Nomada Scopoli.

Submedian cell not longer than the median; maxillary palpi 5-jointed.
Brachynomada Holmberg.

Family VII. CERATINIDÆ.

(The Small Carpenter Bees).

The bees placed in this family I have called "The Small Carpenter Bees," on account of their habits being similar to the large carpenter bees, or the family Xylocopidæ. Indeed, their relationship to this family is extremely close, although I consider them just as closely allied to certain Osmiines in the family Megachilidæ.

The European authority, Dr. Schmiedeknecht, has placed them in the family Xylocopidæ and this arrangement has been followed by Dr. Friese and others.

They are mostly small metallic blue, blue-black (rarely black), blue-green, or bright green bees, almost entirely devoid of pubescence and *without* a distinct polleniferous scopa on hind legs and venter, and in their very much smaller size and general appearance are so totally different from the large carpenter bees that I cannot believe they are at all related. I have therefore not hesitated, since the characters lacking in the species are of great taxonomic importance, to separate them as a distinct family.

Two genera can be distinguished, as follows:

Table of Genera

Third cubital cell, along the cubitus, fully as long as the first, but so much narrowed above, along the radius, that its length is reduced one-half; second cubital cell the shortest, narrowed above; second and third cubital cells each receiving a recurrent nervure beyond the middle; antennæ short, subclavate; head seen from in front a little longer than wide; maxillary palpi 4-6-jointed; labial palpi 4-jointed.

Males; mandibles bidentate ..... 2.

Females; mandibles tridentate.

Maxillary palpi 4-jointed.
Zadontomerus Ashm. n. g. (Type *C. tejonensis* Cr.).

Maxillary palpi 6-jointed ..... **Ceratina** Latreille.

2. Hind femora produced into a large triangular tooth beneath; genital ventral plate trapezoidal, not wider than long; maxillary palpi 4-jointed.
Zadontomerus Ashm.

Hind femora normal; genital ventral plate semicircular, twice wider than long; maxillary palpi 6-jointed ..... **Ceratina** Latreille.

Family VIII. XYLOCOPIDÆ.

(The Large Carpenter Bees).

The bees belonging in this family are for the most part very large, robust bees, having the head and thorax, especially laterally, clothed with a rather dense pubescence, the abdomen convex above, with a ventral scopa, while the hind tibiæ and tarsi in the females are furnished with a dense polleniferous scopa.

These bees closely resemble the bumble bees, and some of the largest bees, if not the largest bees known, belong to it.

I have included with them two genera of uncertain position, namely, *Oxaa* and *Lestes*, which probably should be considered as a subfamily Oxæinæ. They are placed here on account of possessing the long, narrow, marginal cell, which is characteristic of the family.

Dr. Henry Freise has quite recently placed *Oxaa* with certain Colletidæ, *Megacilissa*, *Caupolocana*, etc., but I cannot believe this to be its true position, since the mouth parts are totally different from these bees. Its affinities, it seems to me, are much closer to the Anthophoridæ, where some authorities have already placed it. I believe, however, its true position can only be settled definitely when its habits are known.

The genera which I have recognized in this family may be tabulated as follows:

Table of Genera.

Front wings with three cubital cells.....2.
Front wings with two cubital cells.

Thorax in ♀ with either a blue or bluish gray pubescence; maxillary palpi 5-jointed, the first joint short, stout, the second much the longest joint; labrum in ♀ trilobed; ♂ with the eyes somewhat convergent above, the tibiæ long and rather slender, the hind tibiæ at apex produced into a strong blunt process beneath (Java).

Cyaneoderes Ashm. n. g. (Type *C. Fairchildi* Ashm., also *X. cærulea* Fabr.).

2. Third cubital cell, along the cubitus, only slightly longer than the second, but along the radius a little shorter; second cubital cell oblong-quadrate, never triangular; legs clothed with moderately long, sparse hair....5.

Third cubital cell much longer than either the first or second.

Second cubital cell half the length of the first, quadrate or nearly; first recurrent nervure interstitial or nearly with the second transverse cubitus.....4.

Second cubital cell triangular; first recurrent nervure interstitial or nearly with the second transverse cubitus, sometimes entering the second cubital cell just in front of this nervure; second recurrent nervure received by the third cubital cell a little beyond the middle; eyes densely pubescent.

Scutellum posteriorly truncate, the apical margin acute and projecting over the metanotum; basal abdominal segment broadly, deeply concave at base, the concavity superiorly acutely margined; labial palpi 5-jointed, the three basal joints elongate, the last two minute; eyes extending to base of mandibles, in male more or less strongly convergent above.....3.

Scutellum rounded off posteriorly, not projecting over the metanotum; basal abdominal segments only slightly concave at base, the impression superiorly rounded, not acutely margined; labial palpi 4-jointed; eyes not quite extending to base of mandibles, in ♂ not strongly convergent above; intermediate legs normal.

Xylocopa Latr. = *Shornherria* Lep. (Type *X. violacea* Latr.).

3. Labrum in ♀ trilobed; scape of antennæ cylindrical, not flattened.

Second cubital cell, along the cubitus, much longer than the first; mandibles tridentate; ♂ with the eyes not strongly convergent above, the intermediate legs deformed, their tarsi compressed, with a long, lateral fringe of hairs.....**Mesotrichia** Westw. (Type *M. torrida* W.).

Second cubital cell, along the cubitus, shorter than the first; mandibles bidentate; ♂ with the eyes not or only slightly convergent, the intermediate legs normal, but both the intermediate and the anterior tarsi fringed with very long hairs.....**Koptorthosoma** Gribodo.

Labrum in ♀ unilobed, or with a median carina on ridge; scape of antennæ flattened; second cubital cell, along the cubitus, about equal to the first; ♂ with the eyes strongly convergent above, almost holoptic; front coxæ armed with long spines beneath; front tarsi broadly dilated.

Platynopoda Westw.=*Andineta* Lepel. (Type *X. latipes* Fabr.).

4. Maxillary palpi 4-jointed, gradually tapering from the base to apex, the basal joint stout, about half the length of the second, the third shorter than the basal joint, the apical joint slender, minute; labial palpi 4-jointed, shorter than the labium.....**Lestis** Lepel.

5. Maxillary palpi wanting; first joint of flagellum, in both sexes, elongate, nearly as long as the scape; eyes in ♂ strongly convergent and almost meeting above.....**Oxæa** Klug.

Family IX. MEGACHILIDÆ.

(The Mason, Leaf-cutting and Potter Bees).

The bees placed in this family are exceedingly common, and are found widely distributed into all regions of the globe. In the number of genera and species it will probably exceed all of the other bee families, except possibly the Anthophoridæ.

It seems to be dividable into three natural groups, which I have designated as subfamilies. These may be distinguished by the following simple characters:

Table of Subfamilies

Abdomen in ♀ always with a ventral scopa.

Abdomen above convex; terminal tarsal joint always with a distinct pulvillus between the claws.....Subfamily I. OSMIINÆ.

Abdomen above less distinctly convex, somewhat flat, depressed, rarely subconvex; terminal tarsal joint without a pulvillus between the claws.

Second cubital cell receiving both recurrent nervures; stigma poorly developed, narrowed, but about twice as long as wide; submedian and median cells most frequently equal, rarely with the submedian the longer; abdomen never banded or maculate with white or yellow, at most with hair bands..... Subfamily II. MEGACHILINÆ.

Second cubital cell receiving only one recurrent nervure—the first, the second recurrent joining the radius a little *beyond* the second transverse cubitus, or at most interstitial with it; stigma scarcely developed, at most not or scarcely longer than wide; submedian cell most frequently a little longer than the median, sometimes equal with it; abdomen above bare, always banded or maculate with yellow-white or rufous, never fasciate with hair bands.

Subfamily III. ANTHIDIINÆ.

Subfamily I. OSMIINÆ.

(The Mason Bees).

The bees placed in this subfamily are readily separated or distinguished from the next two families, into which I have divided the family, *by always having a distinct pulvillus between the claws*, a character not possessed by the other two subfamilies. They have, too, quite a distinct habitus of their own, scarcely definable, but readily recognizable by the experienced eye, their heads being slightly different in shape, with usually broader temples, the abdomen more convex above and rarely with distinct white hair bands as in the Megachilinæ. Their color, as a rule, is different, being more or less metallic, dense black, blue-black or blue, and through blue-green to a bright metallic green and cupreous.

The species in only a few genera resemble certain Megachilinæ, i. e., *Trypetes*, *Heriades*, *Chilostoma*, *Ashmeadiella*, etc., and these must be examined with care to distinguish them from some Megachilines.

The habits of the species in this group, so far as they are known, also support their separation as a distinct group from the others. Their nests are made in old posts, trunks and limbs of old and decaying trees, or in the interstices of stone walls, etc., the partitions between their cells being filled with clay and sand or other material, the cells themselves being thickly covered with sand externally.

The genera recognized are as follows:

Table of Genera.

Both recurrent nervures received by the second cubital cell, or the second recurrent is interstitial with the second transverse cubitus.

Claws in ♀ simple, neither cleft or without a subapical tooth, in ♂ cleft or simple; face in ♂ never marked with yellow or white.....2.

Claws in ♀ cleft or with a distinct subapical tooth; in ♂ cleft; face in ♂ anteriorly marked with yellow or white.

Face in ♂ yellow or white; pygidium broadly emarginate at apex, the hypopygium trapezoidal broadly emarginate; maxillary palpi 4-jointed; body above clothed with fulvous hairs; the abdomen short.

Trachusa Jurine = *Diphysis* Lepel.

Face in ♂ with the clypeus anteriorly alone yellow; pygidium triangular entire, the hypopygium normal; body clothed with whitish or cinereous hairs, tinged with ochraceous on vertex and on thorax above, the abdomen with distinct white fasciæ.

Zaeesta Ashm. n. g. (Type *Z. rufipes* Ashm.).

2. Maxillary palpi 4- or 5-jointed.....4.

Maxillary palpi 3-jointed.

Abdomen with the basal impression on the first abdominal segment not bounded superiorly by a distinct transverse elevated line or carina..3.

Abdomen with the basal impression on the first segment bounded superiorly by a distinct transverse elevated line or carina; mandibles tridentate; claws simple; abdomen most frequently fasciate with white.

Trypetes Schenck.

3. Mandibles at apex tridentate; clypeus simple; triangular area of the metathorax smooth, shining; ♂ antennæ not crenulate beneath.

♀ abdomen elongate, longer than the head and thorax united; transverse median nervure in front wings quite interstitial; pygidium in ♂ short, impressed above, but broadly, squarely truncate posteriorly, with acute angles; second ventral segment with a prominent tooth or ridge.

Heriades Spinola.

♀ abdomen broader and shorter, not longer than the head and thorax united, usually somewhat shorter; transverse median nervure in front wings not quite interstitial with the basal nervure, uniting with the median vein a little before the origin of the basal nervure: pygidium in ♂ 4-dentate; second ventral segment normal.

Ashmeadiella Ckll.

Mandibles at apex bidentate: clypeus in ♀ with a lamina, tubercle or ridge anteriorly; triangular area of metathorax opaque, crenulate basally; ♂ antennæ crenulate beneath, the pygidium deeply emarginate, bidentate or forked..**Chelostoma** Latr. = *Gyrodroma* Klug (Thoms.) = *Chelynia* Prov.

4. Maxillary palpi 5-jointed; flagellum in both sexes compressed; abdomen in ♂ elongate, usually with the segments narrowly fasciate, the impression at base of first segment not broad, poorly defined, usually represented by a longitudinal sulcus.....5.

Maxillary palpi 4-jointed; abdomen most frequently shorter, not elongate, the first dorsal segment with a broad, subconcave impression at base, rarely otherwise.

Antennæ similar in both sexes, never deformed in the ♂.....6.

Antennæ dissimilar in the sexes, in ♂ deformed, in ♀ filiform, simple; scape always stout; first dorsal abdominal segment at base convex not broadly impressed, at most with a longitudinal sulcus; stigma in front wings well defined.

Flagellum in ♂ thickened, the joints compressed, submoniliform, nearly of an equal length, the terminal joint abruptly constricted into a slender curved spine; scape large, robust; pygidium triangular, the apical angles of the sixth dorsal segment dentate; second ventral segment with a median prominence or ridge.....**Alcidamea** Cress.

Flagellum in ♂ with the joints of an unequal length, joint 2-5 compressed, dilated, joint 6 suddenly narrowed towards apex, the apical joint simple; scape rather long and robust, slenderer towards base; abdomen elongate; pygidium obtusely triangular, with a deep transverse impression on disk, the apical lateral angles of the sixth segment dentate; first ventral segment subtriangularly produced at apex.

Andronicus Cress.

5. Body black or blue-black, the thorax with a griseous pubescence, sometimes mixed with black hairs; mandibles at apex very broad, 4-dentate, or at least trisinuate; ♀ scopa black; the dorsal segments, except the first or second at sides, not fasciate; ♂ abdomen most frequently with narrow fasciæ, sometimes interrupted medially, the pygidium large, twice as broad as long, with a depression on the disk, the apical margin subarcuate; lateral angles of sixth segment acute.

Monumetha Cress.

6. Malar space wanting, the eyes extending to the base of mandibles; ♀ with the posterior orbits normal, not produced below into a tubercle behind base of mandibles; antennæ in ♂ shorter than the thorax or no longer.....7.

Malar space distinct, as long or a little longer than the pedicel, the eyes not quite extending to base of mandibles; ♀ with the posterior orbits produced at base into an angle or tubercle, usually a little back of the mandibles and between them and the eyes; clypeus in ♀ deeply emarginate anteriorly, and often armed with a horn, tooth or tubercle on each side; ♂ with the antennæ longer than the thorax, the sixth dorsal abdominal segment laterally and apically entire, not sinuate or emarginate, the pygidium semi-circular or obtuse-triangular, entire or at least never deeply emarginate at apex, at most with a very slight sinus.....**Ceratosmia** Thoms.

7. Tibial spurs pale or rufous, never black or blue-black; abdomen most frequently not metallic, very rarely distinctly metallic; ventral scopa in ♀ white, rufous or fulvous, never black; ♂ with the sixth dorsal abdominal segment laterally sinuate, or emarginate and frequently with a lateral tooth, the pygidium at apex emarginate, bi- or tri-dentate, rarely entire.....9.

Tibial spurs black or blue-black; body metallic, or at least the abdomen is metallic, black, blue-black or æneous black.

Ventral scopa in ♀ rufous or black only at apex.....8.

Ventral scopa in ♀ white.....8½.

Ventral scopa in ♀ black.

Mandibles long, rostriform or subrostriform, at apex forcipate; maxillary palpi rather long; metathorax with its basal area opaque or nearly; labrum with two fascicles of black or rufous hairs (one on each side), which project from under the clypeus; ♂ with the antennæ short, the sixth dorsal abdominal segment laterally entire, not sinuate, and with no sinus or incision at apex, the pygidium trapezoidal about twice as wide as long, the apex with only a slight emargination, never deeply emarginate.....**Melanosmia** Schmiedek.

Mandibles not long rostriform, very broad, 4-dentate, and usually with some rufous hairs above towards apex; maxillary palpi short; clypeus with a median production anteriorly; ♂ with the antennæ shorter than the thorax, the sixth dorsal abdominal segment laterally sometimes sinuate, but not toothed, the pygidium deeply emarginate at apex.....**Osmia** Panzer = *Chalcosmia* Schmiedek.

8. Mandibles obtuse or 4-dentate; body black, densely pubescent; ♀ with the antennæ short, the flagellum compressed or subcompressed.

♂ with the antennæ very short, compressed and much dilated towards the base, the third ventral segment armed with a long spine, the pygidium quadrate.....**Arctosmia** Schmiedek.

♂ with the pygidium entire; mandibles 4-dentate, forcipate; body blue-black or æneous black, with fulvous pubescence.

Acerotosmia Schmiedek.

8½. Mandibles in both sexes 3-dentate, the apical tooth acute; clypeus slightly produced anteriorly and squarely truncate; maxillary palpi short; body metallic, or at least submetallic; anterior tibial hook distinct, acute; ♂ with the sixth dorsal abdominal segment laterally most frequently sinuate, but not toothed, with a slight or distinct median emargination apically, the pygidium deeply semi-circularly emarginate, bidentate.

Nothosmia Ashm. n. g. (Type *O. distincta* Cr.).

9. Mandibles differently shaped, not subrostrate; maxillary palpi short, the last joint minute, subobsolete.....10.

Mandibles subrostrate, forcipate; maxillary palpi rather long; body black, subæneous, and more or less densely pubescent, the abdomen fasciate; metathoracic basal area opaque; scopa in ♀ rufous; ♂ with the sixth dorsal abdominal segment at apex emarginate and laterally deeply sinuate and dentate, the pygidium bidentate.

Amblys Klug = *Helicosmia* Thoms. (Type *O. bicornis* L.).

10. Abdomen black or metallic, never rufous; ventral scopa in ♀ white, or more rarely rufous.....11.

Abdomen rufous or rufous and black, punctate; ventral scopa in ♀ white or fulvous; pygidium in ♂ bilobed.

Psendosmia Radoszk. = *Erythrosmia* Schmiedek.

11. Axillæ posteriorly normal, not produced into a spine; occipital margin not acutely rimmed; ventral scopa in ♀ white or rufous.....12.

Axillæ produced into acute teeth posteriorly, which extend beyond the post-scutellum; anterior tibial hooks wanting; occipital margin superiorly acutely margined; ventral scopa in ♀ rufous; ♂ with the sixth dorsal abdominal segment at apex serrated, the first or second ventral segment sometimes spined.....**Hoplosmia** Thoms.

12. Hind tibial spur in ♀ normal; abdomen subdepressed, thinly fasciate with white hairs; ♂ with the second ventral segment simple, not produced into a spine.....13.

Hind tibial spur in ♀ broad, sulcate beneath; body black, the abdomen subglabrous, distinctly punctate and usually subfasciate, the ventral scopa rufous; clypeus at apex simple, the disk sometimes with a smooth impression; mandibles 3-dentate; anterior tibial hook wanting or indistinct; ♂ with the second ventral segment armed with a long spine or tooth.

♂ pygidium elongate-quadrate, the apex slightly rounded, not emarginate or forked.....**Acanthosmia** Thoms.

♂ pygidium trapezoidal and deeply emarginate at apex, therefore bidentate, the sixth dorsal segment laterally slightly sinuate, but entire at apex, although on its disk apically is a slight median furrow or sulcus.

Acanthosmioides Ashm. n. g. (Type *O. odontogaster* Ckll.).

13. Body black, not at all metallic; pygidium in ♂ not tridentate.....14.

Body metallic; pygidium in ♂ tridentate.

Clypeus in ♀ subemarginate or truncate, in ♂ tridentate; thorax above clothed with dense fulvous hairs; abdomen fasciate, the ventral scopa rufous, rarely whitish; mandibles in ♀ 3-dentate, in ♂ bi-dentate; pygidium in ♂ deeply bi-emarginate, forming 3 teeth, the median tooth acute, the lateral teeth rounded at apex, the sixth dorsal segment laterally sometimes dentate.....**Tridentosmia** Schmiedek.

14. Clypeus at apex serrate-crenulate; anterior tibial hook distinct; front wings with the transverse median nervure uniting with the median vein a little *before* the origin of the basal nervure or interstitial; mandibles in ♀ 3-dentate, in ♂ 2-dentate; ♂ with the pygidium semi-circular, entire, the sixth dorsal abdominal segment laterally strongly emarginate, forming a tooth.

Hoplitis Klug = *Ctenosmia* Thoms. (Type *O. adunca* Panz.)

Clypeus anteriorly rounded, unarmed; anterior tibial hook generally wanting or poorly developed, obtuse; front wings with the transverse median nervure uniting with the median vein a little *beyond* the origin of the basal nervure; mandibles in both sexes 3-dentate; ♂ with the pygidium emarginate at apex or forked, the sixth dorsal abdominal segment laterally sinuate, dentate.

Anthocopa Latreille = *Furcosmia* Schmiedek.

Clypeus at apex unarmed; body black, with fulvous hairs, the abdomen fasciate, the scopa rufous; mandibles 4-dentate; ♂ with the pygidium with a deep impression or fovea on its disk, the sixth dorsal abdominal segment laterally dentate, the middle femora armed with a tooth beneath.....**Megalosmia** Schmiedek.

Subfamily II. MEGACHILINÆ.

(The Leaf-cutting Bees).

The bees placed in this subfamily closely resemble those in the former, and it requires long practice and an experienced eye to separate some of them from each other, although the head, as a rule,

is more transverse, the temples not so broad, the stigma in front wings poorly developed, but narrower and longer, while the abdomen above is more depressed, most frequently distinctly fasciate or with white hair bands, the basal segment sharply truncate or broadly concave at base, so as to fit close to the metathorax when elevated. The absence of pulvilli between the claws is, however, the only reliable character that will separate them.

To this group or subfamily belong the genuine leaf-cutting bees, so called from the habit the female has of cutting small, almost circular pieces out of the tender leaves of various trees and plants, wherewith to line its cells. The cells themselves are cylindrical, tubular, or, in outline, not unlike a small open-mouthed vial, composed of numerous layers of pieces of leaves, wrapped into shape, layer upon layer, as a cigarmaker wraps his cigar; these cells are arranged in rows, end to end, one upon each other, in burrows or tunnels made in the ground or in decaying wood.

The genera are not numerous and may be recognized by the use of the following table:

Table of Genera.

Second cubital cell receiving both recurrent nervures.

Mandibles strong, broad, dilated at apex and 3-, 4- or 5-dentate.....2.

Mandibles narrower, simple, bi- or tri-dentate, never broad or dilated at apex.

Mandibles simple or bidentate at apex; ♀ with a prominent lamina beneath the insertion of antennæ; pygidium in ♂ simple or trilobed; maxillary palpi 6-jointed; labial palpi 4-jointed.

♀ with the inner spur of hind tibiæ lunulate and finely serrated within; apical abdominal segments in ♂ trilobed; mandibles simple.

Ctenoplecta Smith.

♀ with the inner spurs of hind tibiæ normal; apical abdominal segment in ♂ unarmed, the antennæ long, the apical two joints compressed, spatulate; mandibles in ♂ simple, in ♀ bidentate.

Steganomus Ritsema = *Cyathocera* Smith.

Mandibles tridentate or subtridentate; ♀ with a prominent lamina or ridge beneath the insertion of the antennæ; pygidium in ♂ terminating in a tooth or strong spine, the antennæ normal; maxillary and labial palpi 4-jointed.....**Liturgus** Latr.

2. First cubital cell not longer than the second, of an equal length or nearly; maxillary palpi 4-jointed.....**Megachile** Latr. (sens lat.).

First cubital cell distinctly longer than the second.....3.

3. Marginal cell appendiculate at apex, or at least with a stump of a vein.....4.

Marginal cell not appendiculate at apex.

Labial palpi 4-jointed, the two basal joints elongate, 3 4-jointed, subclavate; maxillary palpi 2-jointed, minute; antennæ long, joints 9–11 very long and slender, 12–13 abruptly clavate.....**Thaumatosoma** Smith.

4. Abdomen above highly convex; mandibles with the outer tooth strong and very acute, usually with a pencil of long ferruginous hairs before tips; outer apical edge of tibiæ acute; claws long, acute, simple.
Chalicodoma Lepel.

Subfamily III. Anthidiinæ.

(The Potter Bees).

The bees belonging here are always brightly colored or ornate, and are at once distinguished from those in the two preceding subfamilies by having the second recurrent nervure uniting with the radius *beyond* the second transverse cubitus or cubital cell, or at most *interstitial* with the second transverse cubitus. In no species that I have examined have I found a single specimen with the second cubital cell receiving both recurrent nervures.

All of the bees belonging here are also readily distinguished from the others by their color being either black and rufous or rufous and yellow, with the abdomen always banded or maculate with yellow, white or rufous.

The habits of the group, too, curiously enough, is also quite different from the others. The female, normally, constructs a globular cell, not unlike in appearance to that of an Eumenid, but much smaller, attached to the stem of a plant, and made of a waxy-like substance and down stripped from pubescent or woolly-leafed plants.

Only three genera have been recognized, distinguished as follows:

Table of Genera.

Second recurrent nervure joining the radius behind the second transverse cubitus. ..... 2.

Second recurrent nervure interstitial with the second transverse cubitus.

Maxillary palpi 2-jointed; labial palpi 4-jointed; abdomen more or less ornate with tufts or fasciæ of white pubescence; the seventh segment in ♂ with a slender median spine and with two longer, stouter lateral spines ..... **Serapis** Smith.

2. Maxillary palpi 2-jointed; labial palpi 4-jointed; abdomen red or ferruginous, not spotted or fasciate with yellow; ♂ abdomen at apex tridentate.
Euaspis Gerst.

Maxillary palpi 1-jointed; labial palpi 4-jointed; abdomen most frequently black, rarely ferruginous, fasciate or maculate with yellow, rarely ornate with white; ♂ abdomen nearly always toothed or spined at apex ..... **Anthidium** Fabr.

Family X. STELIDÆ.

(Parasitic Bees).

This family is composed of genuine parasitic bees, living—like

the Nomadidæ—in the nests of other bees, species belonging to it having been bred from the cells of *Anthophora*, *Megachile*, *Anthidium*, *Osmia*, etc. All are without a ventral scopa, and also without scopa on the hind legs.

The species composing it come nearest to the Megachilidæ, and some of the genera, as has been suggested by Dr. Friese, are offshoots from some of these bees.

The parasitic habits, so noticeable in various groups of insects, primarily or originally, I think, must have been evolved or developed independently, through lack of sufficient food supply, until it became acquired and hereditary in the offspring,

The family is dividable into two subfamilies:

Table of Subfamilies.

Claws with pulvilli between.....Subfamily I. STELIDINÆ.
Claws without pulvilli between.....Subfamily II. CŒLIOXINÆ.

Subfamily I. STELIDINÆ.

The bees placed in this group, as with the Osmiinæ in the Megachilidæ, always have a distinct pulvillus between the claws, which readily separate them from those found in the Cœlioxinæ.

Dr. Henry Friese suggests that the group, or at least the genus *Stelis*, originated from *Anthidium*.

Five genera are now recognizable:

Table of Genera.

Second cubital cell receiving only one recurrent nervure, the second recurrent uniting with the cubitus behind the transverse cubitus.....2.
Second cubital cell receiving both recurrent nervures.
Abdomen black or blue-black, usually with white transverse bands or maculate; mandibles tridentate; maxillary palpi 2-jointed; ♂ with the pygidium subemarginate, the hypopygium tridentate.
Melanostelis Ashm.
2. Abdomen black or rufous and black, immaculate, clothed with a scattered pubescence; scutellum rounded and produced behind over the base of the abdomen.....4.
Abdomen black or rufous, and most frequently ornate with white or yellow spots; scutellum quite differently shaped, normal or with lateral teeth; maxillary palpi 1 or 2-jointed (rarely wanting); labial palpi 4-jointed.
Scutellum with lateral teeth behind; head narrower than the thorax.....3.
Scutellum without lateral teeth behind; head fully as wide as the thorax.
Clypeus not lengthened, well rounded; maxillary palpi 1 or 2-jointed; abdomen semiglobose, the segments broadly banded with yellow or white, as in *Anthidium*, ♂ with the anal segment entire, rounded, ending in a strong thorn.....**Protostelis** Friese.

Clypeus lengthened and deeply emarginate; maxillary palpi 1-jointed; abdomen longer, cylindrical, with large white spots, in ♀ with the apical margin of the sixth segment toothed, in ♂ with the seventh armed with a tooth.....**Stelidomorpha** Moraw.

3. Clypeus rounded, not lengthened; maxillary palpi 2-jointed; abdomen rounded or oval, black, rarely with small, indistinct maculæ; ♂ with the seventh segment rounded.....**Stelis** Panzer.

4. Apex of scutellum with a deep median depression; maxillary palpi 2-jointed; labial palpi 4-jointed; mandibles 3-dentate; apical abdominal segment in ♂ tridentate.....**Parevaspis** Ritsema.

Subfamily II. Cœlioxinæ.

The bees composing this group are very much commoner and much more numerous in genera and species than are the Stelidinæ. Their habitus also is quite different; as a rule, more robust, less ornate, black, or at most with a rufous abdomen, the segments being somewhat constricted at sutures, or, if not, the abdomen is acutely pointed at apex; claws always *without* pulvilli between.

Dr. Friese suggests that *Cœlioxys*, *Dioxys*, etc., originated from *Megachile*.

The genera are fairly numerous, separated as follows:

Table of Genera.

Marginal cell at apex more or less remote from the costa, or somewhat truncate..2.

Marginal cell at apex attaining the costa.

Median and submedian cells about equal; mandibles simple; hind femora normal.....**Hypochrotœnia** Holmberg.

Median and submedian cells unequal; mandibles at apex bidentate; hind femora much swollen, their tibiæ dilated, the tarsi very long.

Œdiscelis Philippi.

2. Marginal cell at apex acuminate or narrowly rounded; mandibles usually dentate..... 3.

Marginal cell at apex truncate or broadly rounded, most frequently with a slight appendage; mandibles acute or at least not dentate; abdomen rufous or rufous and black, ornate, rarely entirely black.....5.

3. First cubital cell distinctly longer than the second.....8.

First cubital cell not longer than the second, equal or distinctly shorter; third antennal joint normal.....4.

4. First cubital cell equal to the second or only slightly shorter; second cubital cell receiving both recurrent nervures, the first near its basal angle, the second before its apex; submedian cell much longer than the median; abdomen short, elliptic or oval-lanceolate; labial palpi 4-jointed, the first more than twice longer than the second, obconical, the last hardly longer than the third, fusiform.....**Pseudopeolus** Holmberg.

First cubital cell distinctly shorter than the second, the latter receiving both recurrent nervures, the first at its basal third, the second just before the second transverse cubitus; submedian and median cells of an equal length; abdomen oval.....**Biastes** Panzer.

5. Scutellum bilobed or strongly bituberculate; postscutellum unarmed.....6.
Scutellum simple, not distinctly bilobed.
Postscutellum armed with a small tooth.
Antennæ somewhat distant at base; maxillary palpi 6-jointed.
Ammobates Latr. = *Phileremus*, Latr.
Antennæ strongly approximate at base.
Maxillary palpi 3-4-jointed.....**Ammobatoides** Schenck.
Maxillary palpi 2-jointed.....**Melanempis** Sauss.
Postscutellum unarmed.
First cubital cell twice the length of the second; median and submedian cells nearly equal; first recurrent nervure interstitial; claws with a median tooth.....**Chilicola** Spinola.
6. Both recurrent nervures received by the second cubital cell.....7.
First recurrent nervure received by the first cubital cell, or interstitial with the first transverse cubitus.
Marginal cell very small and short, scarcely the length of the stigma.
Front wings with two complete cubital cells and three discoidal cells.
Neolarra Ashm.
Front wings with only one complete cubital cell and two discoidal cells.
Phileremulus Ckll.
Marginal cell not small, but long, much longer than the stigma.
Front wings with the normal number of cells, the first cubital cell longer than the second, the second narrowed above; labial palpi 4-jointed, maxillary palpi 6-jointed.
Neopasites Ashm. (Type *P. fulviventris* Cr.).
7. Marginal cell much longer than the stigma.
First cubital cell much longer than the second.
Labrum nearly three times as long as wide; maxillary palpi wanting; labial palpi 2-jointed; antennæ 12-jointed in both sexes..**Pasites** Jurine.
Labrum triangular; labial palpi (?) 5-jointed.
Schmiedeknechtia Friese.
Labrum quadrate, with a delicate, median carina anteriorly; maxillary palpi 6-jointed; third antennal joint elongate, nearly thrice as long as the fourth.....**Phiarus** Gerst.
First cubital cell somewhat shorter than the second; labrum subquadrate; maxillary palpi 4-jointed, the first joint elongate, slender, the last as long as 2-3 united.....**Homaehthes** Gerst. = *Morgania* Smith.
8. Axillæ produced posteriorly into acute teeth; eyes hairy or glabrous, in the latter case the postscutellum armed with a tooth or spine.....11.
Axillæ normal, not acutely toothed; eyes always bare; both recurrent nervures received by the second cubital cell, or rarely with the first recurrent nervure interstitial or received by the first cubital cell just before the first transverse cubitus.
First cubital cell twice as long as the second, the second recurrent nervure received at the middle of the second cubital cell.....10.
First cubital cell not twice as long as the second.
Median and submedian cells unequal.....9.
Median and submedian cells equal, the transverse median nervure interstitial with the basal nervure; maxillary palpi 6-jointed; labial palpi 4-jointed.

Front wings with two recurrent nervures, both received by the second cubital cell.....**Allodape** Lepel.

Front wings with only one recurrent nervure, the second wanting, the third discoidal cell absent.....**Exoneura** Smith.

9. Second cubital cell receiving both recurrent nervures.

Abdomen black or rufous and black, almost glabrous; venter in ♀ naked, the anal segment excised; ♂ antennæ 12 13 jointed; scutellum bituberculate; postscutellum unarmed; maxillary palpi 4-jointed.

Melittoxena Morawitz Type *M. truncata* Nyl.) = ? *Nomadita* Mocs.

Abdomen red and black, opaque, closely and densely punctate, the dorsal segments at apex banded with an appressed, whitish pubescence; no transverse furrow at base of segments; axillæ acute or toothed at apex; postscutellum armed with a median tooth.

Hoplopasites Ashm.

Second cubital cell receiving only one recurrent nervure—the second, the first recurrent being received by the first submarginal cell at its apex.

Abdomen red; dorsal segments 2–5 and the ventral segments 2–4 with deep, transverse furrows at base; pygidium with a median carina; scutellum unarmed.....**Holcopasites** Ashm n. g.

10. Median and submedian cells equal or nearly.

Maxillary palpi 5-jointed, the joints slender, elongate; labial palpi 4-jointed, the first joint large, elongate.....**Cænoprosopis** Holmb.

11. Eyes glabrous; postscutellum armed with a tooth or spine; teeth of mandibles unequal, the apical tooth much the longer.

♀ with the last abdominal segment truncate, in ♂ with the penultimate and ultimate ventral segments with a lateral apical tooth.

Dioxys Lepel.

♀ with the last abdominal segment acuminate, in ♂ with the penultimate ventral segment laterally bidentate.....**Paradioxys** Mocs.

Eyes hairy; postscutellum unarmed; abdomen conical, in ♀ acuminate at apex, in ♂ armed with porrect teeth or spines; maxillary palpi 3-jointed.....**Cœlioxys** Latreille.

Family XI. PANURGIDÆ.

In this family I have placed all the Andrenoid bees, having but two cubital cells in the front wings, and possibly this is the only character that will hold them together, since, otherwise, characters of mouth parts, tongue, labial palpi, etc., there is the greatest diversity in length and structure. It is therefore a composite family, or what the French would call *une famille de convenience*.

The family, as here defined, probably had its origin from three distinct sources: some of the genera are clearly recent developments from *Andrena* and *Halictus*, others probably came from the Anthophoridæ, while still others have had a different or obscure origin.

The genera placed here are quite numerous, but I believe may be easily recognizable by the characters made use of in the following table:

Table of Genera.

Marginal cell at apex more or less remote from the costa, or broadly, obliquely truncate.....5.

Marginal cell towards apex acuminate, attaining the costa.

Abdomen usually rather long; second joint of hind tarsi normal, inserted in the middle of the first.....2.

Abdomen short, subglobose, black, shining, with white fasciæ at apex; second joint of hind tarsi angulate beneath, not inserted in the middle of the first; clypeus in ♂ yellow, the hind femora incrassated; antennæ in both sexes filiform, longer than the head; tongue short; maxillary palpi 6-jointed, labial palpi 4-jointed.....**Macropis** Panzer.

2. Body, and more particularly the thorax, distinctly pubescent, the abdomen with white fasciæ.....3.

Body sparsely pubescent, the thorax rarely densely pubescent, the abdomen always glabrous, shining, not fasciate, although the anal segment is distinctly ciliate at apex.

Transverse median nervure interstitial, or very nearly.

Anal lobe in hind wings not longer than the submedian cell; head and thorax sparsely pubescent; abdomen in ♀ black, not at all fasciate; clypeus in ♂ black, the antennæ longer than the thorax, the flagellar joints nodose beneath.....**Halictoides** Nyl.

Anal lobe in hind wings distinctly longer than the submedian cell; head and thorax rather densely pubescent; abdomen in ♀ rufous or brownish, or at least reddish at apex of the segments; clypeus in ♂ yellow, the antennæ not longer than the thorax, normal..**Parandrena** Robt.

Transverse median nervure not interstitial, joining the median vein *before* the basal nervure; antennæ in ♂ not longer than the thorax, the flagellum simple; maxillary palpi 6-jointed, the joints subequal; labial palpi 4-jointed, the first joint the longest, about as long as joints 2–3 united, the third longer than joints 2–4.

Dufourea Lepel. = *Hemihalictus* Ckll.

3. Submedian cell usually shorter than the median, or never longer, the transverse median nervure joining the median vein *before* the origin of the basal nervure or interstitial with it.....4.

Submedian cell a little longer than the median, the transverse median nervure joining the median vein *beyond* the origin of the basal nervure.

Thorax above with fulvous or ferruginous hairs; maxillary palpi 6-jointed; labial palpi 4-jointed.....**Biareolina** Dufour. = *Callandrena* Ckll.

4. Thorax above usually with a whitish or griseous pubescence, very rarely with a slight ochraceous tinge.

Labial palpi deformed, the basal joint long and quite different from the last; face in ♀ with blackish hairs; antennæ in ♂ longer than the thorax, the apical joint attenuate from the middle.**Rhophites** Spin.

Labial palpi normal, all the joints being similar and nearly equal; face in ♀ with white hairs; antennæ in ♂ as long as the thorax, the last joint acuminate at apex only.**Rhophitoides** Schenck = *Hesperapis* Ckll.

5. Marginal cell at apex more or less acuminate or narrowly rounded, not or rarely truncate, although sometimes appendiculate; mandibles dentate.....11.

Marginal cell at apex truncate; mandibles at apex acute or narrowly rounded, not dentate.

Front wings with two recurrent nervures.....6.

Front wings with only one recurrent nervure, the second recurrent obliterated; cheeks with a tooth behind (see below for characters of mouth parts).....**Perditella** Ckll.

6 First cubital cell distinctly or much longer than the second; maxillary palpi 6-jointed.....7

First cubital cell equal to or not much longer than the second.

Maxillary palpi 4-jointed; abdomen black, smooth, shining, bare above, with the sides and fifth segment fimbriate with white hairs; labial palpi 4-jointed, the first joint almost as long as joints 2–4 united.

Scrapter Lepel. (Type *S. brullei* Lepel.)

Maxillary palpi 6-jointed; abdomen bare, with white bands; face and clypeus white or with a white spot; second cubital cell receiving both recurrent nervures; submedian cell considerably shorter than the median cell.....**Camptopœum** Spin.

7 Species not almost entirely yellow.....8

Species yellow or almost entirely yellow; labial palpi very long, 4-jointed, the first joint fully twice as long as joints 2–4 united.

Frontal foveæ very distinct, long linear, black; clypeus semi-circular at base (i. e., the suture separating it from the face forms a semi-circle; claws simple; pygidial plate almost obtrapezoidal ♀ (♂ unknown).

Philoxanthus Ashm. (Type *P. beatus* Ckll.)

Frontal foveæ very small, represented by a rounded or oval black puncture; clypeus obtrapezoidal at base; claws cleft (♂ (♀ unknown to me).

Perditella Ckll.

8 Abdomen æneous or rufous and black, ornate with red, yellow or whitish maculæ or bands; face usually yellow or marked with yellow or white; stigma well developed; recurrent nervures interstitial respectively with the first and second cubiti, or both are received by the second cubital cell.....9

Abdomen black, rufous or yellow, neither maculate nor banded; stigma either large, well developed or poorly developed, sublanceolate; both recurrent nervures received by the second cubital cell, or the first is interstitial with the first transverse cubitus.....10.

9 Marginal cell not short, much longer than the stigma, fully twice as long, and as long or nearly as long as the first discoidal cell.

Submedian cell a little shorter than the median; tongue long, lanceolate; labial palpi 4-jointed, the first joint very long, 7 or 8 times longer than joints 2–4 united, contracted at base; head not wider than the thorax; claws cleft.....**Nomadopsis** Ashm.

Submedian cell much shorter than the median; tongue short, flat, acute at apex; labial palpi 4-jointed, the first long and stout, but scarcely twice as long as 2–4 united; head wider than thorax; claws cleft.

Spinoliella Ashm. n. g. (Type *Campt. nominidei* Spin.)

Marginal cell very short, shorter than the stigma or no longer, and always very much shorter than the first discoidal cell; labial palpi 4-jointed, the first joint very long and usually somewhat thickened, fully twice as long or even more than twice as long as joints 2–4 united; hind tibial spurs finely serrated.

Claws in ♀ simple, in ♂ with the anterior and middle claws cleft, the hind claws simple **Cockerellia** Ashm. (Type *P. hyalina* Cr., *albipennis* Cr.).

Claws in both sexes cleft.....**Neoperdita** Ashm. (Type *P. zebrata* Cr.).

10. Marginal cell short, not longer than the stigma, usually shorter, the stigma large, well developed.

Head seen from in front rounded, or a little longer than wide, rarely wider than long; clypeus somewhat produced, truncate anteriorly, the labrum distinct, transverse; labial palpi 4-jointed, the first joint the longest, but rarely longer or much longer than joints 2-4 united; claws cleft.....**Perdita** Smith (Type *P. halictoides* Smith).

Marginal cell long, always much longer than the stigma.

Stigma rather small or narrow, lanceolate; head large, seen from in front usually much wider than long; tongue very long; labial palpi 4-jointed, the first joint very much longer than joints 2-4 united; claws cleft; hind tibial spurs finely serrate; antennæ short, scarcely as long as the width of the head.....**Macrotera** Smith.

Stigma broad, oblong-oval, or at least not lanceolate; head normal, as seen from in front rounded, not or very little wider than long; antennæ longer than the width of the head.

First cubital cell, along the cubitus, not greatly longer than the second.

Hind tibiæ and tarsi in ♀ with a long, dense pubescence; clypeus in ♂ black, with long hairs; legs black; labial palpi 4-jointed, the first joint very long, usually longer than 2-4 united; abdomen without hair fasciæ.....**Panurgus** Latr.

Hind tibiæ and tarsi in ♀ with a short, rather sparse pubescence; clypeus in ♂ usually yellow or marked with yellow, hardly pubescent; legs black, varied with yellow; labial palpi 4-jointed, the first about as long as joints 2-4 united or somewhat longer.

Mesopleura bare or nearly; stigma in front wings very large, oval or elliptical; abdomen punctate, most frequently black, rarely rufous or rufous and black, the dorsal segments never with apical hair fasciæ.

Panurginus Nyl. = *Pseudopanurgus* Ckll.

Mesopleura with a whitish or cinereous pubescence; stigma in front wings narrower, not so large; abdomen black or æneous black, impunctured, or at most finely shagreened, the dorsal segments with hair fasciæ at apex, although sometimes interrupted.

Calliopsis Smith (Type *C. andreniformis* Sm.).

First cubital cell, along the cubitus, about twice, or nearly, as long as the second; each cubital cell receiving a recurrent nervure; transverse median joining the median vein much before the origin of the basal.

Scapteroides Gribods.

11. Median and submedian cells of an unequal length, the transverse median nervure uniting with the median vein somewhat before the origin of the basal nervure; claws cleft.

Stigma large, broad, well developed, the marginal cell not short, longer than the first discoidal cell.....12.

Stigma neither large nor broad, sublanceolate, the marginal cell short, obliquely truncate at apex and not quite as long as the first discoidal cell; second cubital cell narrowed one-half or more *above;* head seen from in front much broader than long; palpi as in *Macrotera* Smith; abdomen in ♀ black, in ♂ red.

Macroteropsis Ashm. n. g. (Type *Perdita latior* Ckll.).

12. Cubital cells, along the cubitus, very unequal, the first about thrice as long as the second, the latter quadrate or nearly; first recurrent nervure received by the first cubital cell near the apex, the second recurrent by the second cubital cell also near the apex; submedian cell much shorter than the median; head not wider than the thorax, but seen from in front oblong, about twice as long as wide, the eyes fully thrice as long as wide or more; antennæ clavate; mandibles bidentate at apex; maxillary palpi 6-jointed; labial palpi 4-jointed, the first joint the longest.....**Hylœosoma** Ashm.

Cubital cells, along the cubitus, equal or nearly, the first usually a little the longer; transverse median nervure interstitial with the basal nervure; head normal.

Second cubital cell narrowed fully one-half or more above; head and thorax pubescent, bare or nearly on vertex and metathorax; flocculus on hind tibiæ and tarsi normal; abdomen rufous, the dorsal segments 2–4 delicately but not sharply depressed at apex; clypeus with a transverse impression anteriorly. South America (Argentine).

Perditomorpha Ashm. n. g. (*P. Brunerii* Ashm.).

Second cubital cell narrowed one-third above; thorax clothed with a dense pubescence; flocculus on hind tibiæ and tarsi long, dense; abdomen black, pubescent and fasciated; maxillary palpi 6-jointed; labial palpi 4-jointed, subequal, the joints enlarged at apex...**Dasypoda** Latr.

Family XII. ANDRENIDÆ.

(The Acute-tongued Burrowing Bees).

This family is of great extent and very numerous in species, which are closely allied and extremely difficult to separate. They are found widely distributed over all parts of the world and in every clime, climate apparently having little effect upon the distribution of certain of the genera and species. Most of them, but not all, have short acute tongues, and are found in late Spring and Mid-Summer making their burrows in clay banks and in hard, compact soils of various kinds, hence the name given to them above seems most appropriate.

Some Andrenids in color and on account of the dense pubescence on the head and thorax bear a striking resemblance to some of the Anthophorids, and may be easily confused with them. The labrum is, however, never large and free, although more or less distinctly visible, while the joints of the labial palpi are cylindrical, all much alike in general appearance, the first two joints never compressed, valvate as in the Apidæ, Bombidæ, Anthophoridæ, etc.

A little care at first, as to the general habitus of the venation, mouth parts, etc., will soon enable the student to separate at a glance an Andrenid from other bees.

The three cubital cells in the front wings, as well as usually the much shorter tongue, separate them from the Panurgidæ, which have only two cubital cells. Some Panurgid genera, however, have also short tongues and are in no way to be distinguished from the Andrenids, except in having only two submarginal cells. They are evidently recent offshoots from an Andrenid stock.

The family may be separated into three subfamilies as follows:

Table of Subfamilies.

First branch of basal nervure always strongly curved or bent inwardly, forming a segment of a circle; epimera of mesothorax well separated, distinct ..... 2.

First branch of basal nervure straight or very nearly, never strongly curved inwardly; epimera of mesothorax not or scarcely separated; hind tibiæ in both sexes with a knee plate ... Subfamily I. ANDRENINÆ.

2. Hind femora and tibiæ in ♀ with a distinct flocculus or scopa, the ventral scopa sparse, but distinct; fifth abdominal segment always *with* a rima ..... Subfamily II. HALICTINÆ.

Hind femora and tibiæ in ♀ without a distinct flocculus or scopa, when present very sparse and thin, and scarcely noticeable; fifth abdominal segment *without* a rima; venter bare ..... Subfamily III SPHECODINÆ.

Subfamily I. ANDRENINÆ.

The bees belonging to this group are exceedingly numerous and common, appearing very early in the Spring and lasting all during the Summer months, being most active in nest building during the months of June and July. Their nests are made in burrows or tunnels in the ground or in hard clay banks, preferably the latter. The tongue in all the genera is short and triangularly pointed, the labial palpi 4-jointed, the maxillary palpi usually 6-jointed, while the basal nervure is straight or nearly, never curved or strongly bent inwardly, as in the Halictinæ and the Sphecodinæ; the scopa on the hind legs, in ♀, being always distinct, well developed.

Table of Genera

Front wings with three cubital cells.

Marginal cell at apex acuminate or narrowly rounded, never truncate ... 4

Marginal cell at apex obliquely truncate and usually with a short appendage (or stump of a vein) from the lower angle ..... 2.

2. First cubital cell, along the cubitus, as long as the second and third united or nearly ..... 3.

First cubital cell, along the cubitus, about as long as the third, the latter narrowed one-half above along the radius, and receiving the second recurrent nervure far beyond its middle; second cubital cell quadrate, receiving the first recurrent nervure beyond its middle; head very

broad, wider than the thorax, seen from in front wider than long; labrum distinct, but strongly inflexed, twice as wide as long; mandibles simple, acute at apex; labial palpi 4-jointed, slender; middle tibial spur and one of the hind tibial spurs finely serrated; abdomen broadly oval, wider than thorax and marked with yellow.

Liphanthus Reed.

Second and third cubital cells each receiving a recurrent nervure beyond the middle; labial palpi 4-jointed; maxillary palpi 6-jointed; middle and hind tibial spurs pectinate or finely serrated.

Head distinctly and sometimes much wider than the thorax, marked with yellow or white, the superorbital foveæ long, linear; abdomen not elongate, always banded or marked with yellow or white, the dorsal segments broadly depressed at apex and differently sculptured from the anterior portion, the first segment with a median grooved line at base; first joint of labial palpi the longest and stoutest, joints 2–4 subequal.

Psænythia Gerst.

Head not wider than the thorax, although marked with yellow or white anteriorly, the superorbital foveæ long, linear; abdomen much elongate, black, neither banded nor maculated; first joint of labial palpi the longest and stoutest joint; mandibles acute.

Protandrena Ckll.

Second cubital cell receiving the first recurrent nervure near its base, the second recurrent interstitial with the third transverse cubitus; labial palpi 4-jointed, the joints subequal, short, stout and cylindrical, but gradually becoming slenderer; abdomen oblong-oval, fasciate, with white hair bands.....**Apista** Smith.

4. First cubital cell, along the radius, usually much longer than the third.....6.

First cubital cell, along the cubitus, not or scarcely longer than the third, equal or nearly, or a little shorter, the second small, quadrate or transverse-quadrate, the third narrowed above.....5.

5. Tegulæ normal; axillæ never acute behind; abdomen neither banded nor fasciate, the dorsal segments 1–4 depressed at apical margin; all tibial spurs pectinate; maxillary palpi 6-jointed; labial palpi 4-jointed, the first as long as joints 2–4 united and also stouter; mandibles obtusely bidentate; hind femora in ♂ not greatly swollen, their tibiæ, however, dilated towards apex and produced into a strong spine beneath.

Epinomia Ashm. n. g. (Type *N. persimilis* Ckll.).

Tegulæ very large; axillæ sometimes acute or toothed posteriorly; hind femora in ♂ abnormally swollen or enlarged.

♀ with a long, distinct, middle tibial spur; ♂ with the apical joint of antennæ simple, not compressed, spoon shaped.

Abdomen with the dorsal segments apically depressed and fasciate with whitish hair bands; ♂ antennæ normal, not tapering to a point at apex.....**Nomia** Latreille.

Abdomen with the dorsal segments 2–5 apically banded with smooth, greenish, yellow or whitish non-pubescent bands; ♂ antennæ tapering off to a point at apex.....**Paranomia** Friese.

♀ without a middle tibial spur; ♂ with the apical joint of antennæ compressed, oblong, excavated beneath or spoon shaped.

Monia West. = *Eunomia* Cress.

6. Second cubital cell, along the cubitus, much smaller than the third, rarely much longer than half its length or even shorter.....7.

Second cubital cell, along the cubitus, as long as the third or even a little longer.

Second and third cubital cells equal, the former nearly quadrate, very slightly narrowed above, and receiving the first recurrent nervure at the middle, the third cubital cell receiving the second recurrent a little beyond its middle; maxillary palpi 6-jointed, the first joint the longest, the following gradually decreasing in length; labial palpi 4-jointed, the first joint the longest, the following shorter, subequal.

Callomelitta Smith.

Second cubital cell a little longer than the third, narrowed above and receiving the first recurrent nervure at its middle; the third cubital cell also receives the second recurrent at its middle; maxillary palpi 6-jointed, the first joint longer and stouter than the others, the following successively becoming shorter and slenderer; antennæ clavate, the scape short and stout, one-third shorter than the third joint.

Gastropsis Smith = *Œstropsis* Smith.

7. Submedian vein (or anal vein of some authors) in hind wings distinct to the hind margin; hind trochanters in ♀ with a polleniferous flocculus; antennæ in ♂ not truncate at apex.....8.

Submedian vein in hind wings abbreviated, not extending to the hind margin; hind trochanters in ♀ without a polleniferous flocculus; antennæ in ♂ sometimes truncate at apex.

Head normal, not wider than the thorax; abdomen truncate at base; antennæ in ♂ truncate at apex, the joints subserrate or crenulate beneath.

Melitta Kirby = *Cilissa* Leach.

Head very large, transverse, much wider than the thorax; abdomen rounded at base; antennæ in ♂ filiform, neither truncate at apex nor crenulate beneath.....**Sphecophala** Sauss. (Type *S. philanthoides* Sauss.).

8. Stigma very minute.

Second cubital cell very short, wider (higher) than long, receiving the first recurrent nervure a little before the middle, the second recurrent being interstitial or nearly with the third transverse cubitus, head transverse, not so wide as the thorax; ocelli in a triangle; tongue very short, densely pubescent, the paraglossæ elongate, plumose; labial palpi 4-jointed, short and stout; maxillary palpi 6-jointed.

Ptiloglossa Smith.

Stigma distinct, not small.

Marginal cell pointed at apex, its extreme apex attaining the costa; submedian cell not quite as long as the median; second cubital cell quadrate, receiving the first recurrent nervure at the middle, the third cubital cell receiving the second recurrent nervure at its apical third; abdomen above bare, the dorsal segments 2–4 delicately, but not sharply depressed at apex; pygidial plate triangular, with a median ridge; middle tibial spurs long, finely serrated; maxillary palpi 6-jointed; labial palpi 4-jointed: superorbital foveæ wanting.

Micrandrena Ashm. n. g. (Type *M. pacifica* Ashm.).

Marginal cell more or less narrowly rounded at apex, its extreme tip not attaining the costa; submedian cell fully as long as the median, the transverse median nervure interstitial.

Second cubital cell a little longer than wide, receiving the first recurrent nervure a little beyond the middle, rarely at the middle: the third cubital cell receiving the second recurrent far beyond the middle; abdomen most frequently fasciate or subfasciate with hair bands, more rarely bare; pygidial plate subtriangular, usually subtruncate at apex; maxillary palpi 6-jointed, labial palpi 4-jointed; superorbital fovea very large, broad, represented by broad depressions along the inner upper orbits.....**Andrena** Latr.

Second cubital cell receiving the first recurrent nervure at the middle, the second recurrent received by the third cubital cell at its middle; middle tibial spur and the longer spur of hind tibiæ, which is very long and bent, serrated; maxillary palpi 6-jointed, labial palpi 4-jointed.
Stenotritus Smith.

Second cubital cell wider (higher) than long, narrowed above; along the cubitus about half as long as the first cubital cell, and reaching the first recurrent nervure near the apex; abdomen fasciate; hind tibiæ in ♂ strongly curved and angulately dilated at apex beneath.
Ancyla Lepel. = *Pristotrichia* Radoszk.

Subfamily II. Halictinæ.

The bees belonging to this subfamily agree with the Andreninæ in all essential characters, but the basal nervure in the front wings is always strongly curved or bent inwardly towards base of the wing, the epimera of the mesothorax well separated, distinct, while the apical dorsal segment in the ♀ always has a distinct rima, or median grooved furrow on its disk.

The tongue may be either long or short. The rima on the last dorsal segment, and the distinct scopa or flocculus on hind legs in ♀ must be depended upon to separate these bees from the Sphecodinæ.

Eleven genera are known, recognizable by the aid of the following table:

Table of Genera.

First cubital cell, along the cubitus, distinctly longer than the third, or as long as the second and third united; stigma well developed; transverse median nervure never not angulated.....2.

First cubital cell, along the cubitus, as long or very nearly as long as the third; stigma not well developed; transverse median nervure angulated; maxillary palpi 6-jointed.

Abdomen black, densely pubescent; antennæ in ♀ short, clavate, in ♂ involute at apex, the last joint triangular; labial palpi 4-jointed.
Systropha Latreille.

Abdomen black and rufous, almost bare; antennæ filiform, in ♂ long: mentum and tongue long, slender; tibiæ dilated at lower apical angle. **Trichchostoma** Sauss.

First cubital cell, along the cubitus, shorter than the third; stigma well developed; transverse median nervure straight, interstitial with the basal nervure; scutellum spined; mandibles tridentate; maxillary palpi 6-jointed.

Abdomen very smooth, shining; head and thorax clothed with fulvous hairs; labial palpi 4-jointed, the first joint about as long as joints 2–4 united..... **Mellitidea** Guerin.

2. Abdomen normal, not petiolate-clavate..... .....3.

Abdomen petiolate-clavate; second cubital cell half the length of the third, slightly narrowed above; scape of antennæ two-thirds the length of the flagellum, the latter subclavate; maxillary palpi 6-jointed, the three basal joints short, stout, clavate, joints 4–6 slender, slightly thickened towards apex; labial palpi 4-jointed, the first subclavate, as long as 2 3 united, the two latter short, stout and clavate, the last joint slender, filiform..... **Corynura** Spinola.

3. Third cubital cell receiving only one recurrent nervure—the second, the first recurrent received by the second cubital cell beyond its middle, or before the first transverse cubitus (or very exceptionally interstitial with this nervure)..... .....4.

Third cubital cell receiving both recurrent nervures, or the first recurrent is interstitial with the second transverse cubitus; rarely is the second recurrent interstitial with the third transverse cubitus; maxillary palpi 6-jointed; labial palpi 4-jointed.

Tongue elongate, lanceolate, the paraglossæ long; first joint of labial palpi longer than 2-3 united, the second a little shorter than the third, the third obconical, the last slender, cylindrical; species metallic-blue, blue-green to green..... **Augochlora** Smith = *Oxystoglossa* Sm.

Tongue short, triangular, the paraglossæ not long; first joint of labial palpi about as long as 2–3 united; first recurrent nervure interstitial with the second transverse cubitus; non-metallic species, or at most æneous on the head and thorax; clypeus in ♂ anteriorly always margined with yellow..... **Parasphecodes** Smith.

4. First cubital cell, along the cubitus, as long or somewhat longer than the second and third united, the second quadrate, not or only slightly longer than wide, or much wider (higher) than long, and often considerably narrowed above..... .....5.

First cubital cell, along the cubitus, not longer than the second and third united, usually distinctly shorter, the second quadrate, not wider than long.

Head and thorax metallic, green, blue or blue-green; abdomen in ♀ metallic, black or yellow, in ♂ usually yellow, with black bands, the hind femora in this sex being much swollen, and most frequently with a subapical tooth beneath..... **Agapostemon** Smith.

5. Second recurrent nervure not interstitial with the third transverse cubitus, the second cubital cell not longer than wide, usually wider (or higher) than long; scutellum normal, tongue short, triangular or subtriangular, or in outline cone shaped..... .....6.

Second recurrent nervure interstitial with the third transverse cubitus; second cubital cell quadrate, the third a little longer than wide, slightly narrowed above; tongue very long, spiculiform; labial palpi 4-jointed, the first joint nearly as long as joints 2–4 united. **Megaloptera** Smith.

6. Subdiscoidal nervure in hind wings distinct, well developed; temples broad, or at least never very narrow, sometimes in *Halictus* with a tooth below in ♀; labial palpi 4-jointed.

Ocelli very large, the lateral ocelli almost touching the eye margin.
Sphecodogastra Ashm. n. g. (Type *Parasp. texana* Cr.)

Ocelli normal, the lateral ocelli very distant from the eye margin.
Halictus Latreille.

Subdiscoidal nervure in hind wings wanting or subobsolete; temples very narrow, flattened; labial palpi 2-jointed; abdomen maculate with yellow.
Nomiodes Schenck = *Lucasius* Dours.

Subfamily III. Sphecodinæ.

This subfamily is scarcely distinguishable from the subfamily Halictinæ, agreeing with it in all essential characters, the only differences noticeable, and which may be depended upon to separate the species from those in the latter, are that in the ♀ the hind coxæ and femora are *without* a flocculus, the pollen-brush on their tibiæ and tarsi, although denser on the tarsi, is sparse and thin or nearly wanting, the abdomen being without a distinct ventral scopa, and the last dorsal segment is *without a distinct rima*.

I know of no good character to separate the males from those in the Halictinæ. The head, however, viewed from in front, is a little wider than long, the clypeus not being produced anteriorly, while the metathorax, as a rule, is much more coarsely sculptured than in the Halictinæ, being usually coarsely rugoso-punctate.

The genus *Parasphecodes* Smith, as I have identified it, from a specimen in the National Museum from Australia, is closely allied to *Halictus* and belongs to the Halictinæ. *Parasphecodes texana* Cress. has been wrongly referred to this genus and forms a new genus in the same subfamily.

Only three genera seem to fall into this group as here defined, and these may be distinguished by the use of the following table:

Didonia Gribodo is, however, placed here without an examination of specimens.

Table of Genera.

First cubital cell, along the cubitus, distinctly longer than the second and third united; stigma well developed; subdiscoidal nervure originating at

or a little above the middle of the second transverse median nervure (discoidal nervure); second cubital cell very short, fully twice as wide (or high) as long, first recurrent nervure interstitial with the second transverse cubitus, the second interstitial or nearly with the third transverse cubitus, or received by the hind cubital cell at or beyond its apical third.

Abdomen coarsely punctured, segments 1–3 with a distinct rim or elevated margin at apex; tongue very short, triangular; maxillary palpi 6-jointed; labial palpi 4-jointed, the first a little the longest joint, joints 2–4 subequal.....**Temnosoma** Smith.

Abdomen not coarsely punctured, segments 1-3 not rimmed at apex; tongue elongate, linear, subspiculiform; labial palpi 4-jointed, elongate, almost attaining to the apex of tongue, the first longer than the two following united, the last joint the smallest.....**Didonia** Gribodo.

First cubital cell, along the cubitus, not or scarcely longer than the second and third united; stigma well developed; subdiscoidal nervure originating *below* the middle of the second transverse median nervure; second cubital cell short, wider than long; first recurrent nervure received by the second cubital cell a little beyond the middle, the second recurrent received by the third near its apex; maxillary palpi 6-jointed; labial palpi 4-jointed, the first nearly as long as joints 2–3 united.

Sphecodes Latr.

Family XIII. COLLETIDÆ.

(The Obtuse-tongued Burrowing Bees).

This family, with the next, the Prosopidæ, constitute Westwood's group or section *obtusilingues.*

Bingham has associated both together on account of similarity in the mouth parts, under the name Colletidæ; but there is a wide difference in the habits of the species composing the two families, as here defined, and also in their external structural characters.

Those I have placed in this family are clothed with a more or less dense pubescence on the head and the thorax, while in the Prosopidæ they are bare or nearly, the legs are also more densely pubescent, the hind tibiæ and tarsi in ♀ always with a distinct pollen-brush, while the front wings have three cubital cells, whereas the Prosopidæ only have two.

The economy of the species are similar to those in the family Andrenidæ, since they construct their burrows in hard clay soil, in clay banks or in the interstices of stone walls, etc. The Prosopidæ, on the contrary, burrow in the stems or twigs of bramble and various shrubs.

Ten genera seem to fall into this family and are tabulated below:

Table of Genera.

First cubital cell, along the cubitus, fully as long as the second and third united or nearly.....2.

First cubital cell, along the cubitus, shorter than the second and third united.

Second cubital cell longer than wide, receiving the first recurrent nervure at or a little beyond the middle; third cubital cell narrowed at least one-half above.

First joint of maxillary palpi a little longer and stouter than the second, joints 3–5 subequal, a little longer than thick, the last joint longer than the fifth; joint 1 of labial palpi long, about as long as joints 2–3 united, the last joint shorter than the second, but longer than the third; paraglossæ dilated and rounded at their apices...**Anthoglossa** Smith.

First joint of maxillary palpi a little longer, but scarcely thicker than the second, the following joints very gradually shortening, all more than thrice as long as thick; labial palpi 4-jointed, the first two joints stout, the first much the longer, longer than 3–4 united, the latter being slender and subequal, a little shorter than the second.

Diphaglossa Spinola.

Second and third cubital cells equal, the second subquadrate, only slightly narrowed above; first recurrent nervure interstitial or nearly.

First joint of maxillary palpi a little the longest joint and stoutest, the following subequal; labial palpi 4-jointed, the first about as long as 2–3 united, the third the shortest.....**Caupolicana** Spinola.

2. Second and third cubital cells, along the cubitus, equal or nearly.....3.

Second and third cubital cells, along the cubitus, scarcely longer than the first, the second often wider (higher) than long, very much shorter than the third; marginal cell narrowly obliquely truncate at apex.

First recurrent nervure interstitial with the first transverse cubitus, or received by the first cubital cell just before this vein; third cubital cell receiving the second recurrent nervure towards it apex; submedian cell much shorter than the median.....**Megacilissa** Smith.

First and second recurrent nervures respectively interstitial with the first and second transverse cubital nervures; labial palpi 4-jointed, the joints successively decreasing in length; antennæ subclavate, the third joint only a little longer than the fourth, the following joints increasing in length to the apical joint.....**Madrosoma** Smith.

3. Second recurrent nervure interstitial with the third transverse cubitus; inner spur of hind tibiæ pectinate or combed; joints 1–2 of maxillary palpi stout, subequal, the following joints slender, more than thrice longer than thick; first joint of labial palpi elongate, as long as joints 2–3 united; joints 2–4 also long.....**Lamprocolletes** Smith.

Second recurrent nervure not interstitial, but received by the third cubital cell beyond its middle.

Stigma not well developed, or subobsolete.....4.

Stigma well developed, although not large.

Second recurrent nervure sinuate or somewhat S shaped; hind tibiæ without knee plate: maxillary palpi 6-jointed, the first joint hardly longer than 2–3 united, joints 2–5 scarcely longer than thick, the last a little shorter than the first; labial palpi short, 4-jointed...**Colletes** Latr.

4. Second cubital cell very short, much wider (higher) than long, and, along the cubitus, only about one-third the length of the third, receiving the first recurrent a little before the middle; third cubital cell nearly as long *along the radius* as along the cubitus; joints 2-4 of maxillary palpi longer than thick; first joint of labial palpi long, longer than joints 2-3 united.....**Paracolletes** Smith.

Second cubital cell a little longer than wide and more than half the length of the third, the first recurrent nervure received by it at the middle; third cubital cell, along the radius, only about one-third as long as along the cubitus; joints 2-4 of maxillary palpi three or more times longer than thick; first joint of labial palpi very elongate.

Leioproctus Smith.

Second cubital cell equal narrowed on each side towards the marginal and receiving the first recurrent nervure at its middle; joints 1-2 of maxillary palpi rather long, subequal, both of which are about as long as joints 2-3 united; first joint of labial palpi long, about as long as 2-3 united, the last joint shorter than the third; paraglossæ broad and rounded at apex.....**Dasycolletes** Smith.

Family XIV. PROSOPIDÆ.

(The Obtuse-tongued Carpenter Bees).

This is a small but distinct group or family, at one time supposed to be parasitic, the species agreeing in their mouth parts with the Colletidæ (and many of the wasps), but are readily distinguished from them by having *only two cubital cells* in the front wings, the non-pubescent body, and by the hind tibiæ being *without a distinct pollen brush.*

They are known to burrow into the twigs of bramble, elder and other shrubs, in which, after extracting the pith, they construct their cells—filled with pollen and honey.

Table of Genera.

Marginal cell at apex acuminate, or narrowly rounded, never truncate; mandibles bidentate; body bare or nearly.....2.

Marginal cell at apex somewhat obliquely truncate, with an appendage; body pubescent.

Stigma sublanceolate; first and second cubital cells subequal, the first slightly the longer, the second receiving both recurrent nervures; maxillary palpi 6-jointed, the first joint as long as joints 2-3 united, the following subequal, labial palpi 4-jointed, the first long and stout, longer than the following united.....**Pasiphæ** Spinola.

2. First cubital cell twice as long as the second, or very nearly.....4.

First cubital cell equal to the second, or somewhat smaller, or the second is shorter than the first.

First recurrent nervure received by the first cubital cell just before the first transverse cubitus, the first cubital cell much longer than the second.....3.

Both recurrent nervures received by the second cubital cell, or the second recurrent is interstitial with the second transverse cubitus.

Second cubital cell shorter than the first; labial palpi rather short, the first joint shorter than joints 2-3 united; tongue only slightly emarginate at apex.....**Euryglossa** Smith.

Second cubital cell as long as the first or very nearly; labial palpi elongate, the first joint as long as joints 2-5 united; tongue deeply triangularly emarginate.....**Hylæoides** Smith.

3. Head seen from in front a little longer than wide, slightly narrowed below; frontal foveæ distinctly long, linear; maxillary palpi 6-jointed, the joints short, subequal; labial palpi 4-jointed.....**Prosopis** Fabr.

4. Both recurrent nervures received by the second cubital cell, or the first recurrent is interstitial with the first transverse cubitus; sometimes the second recurrent is interstitial with the second transverse cubitus (very exceptionally does the first recurrent joint the first cubital cell just before the first transverse cubitus); maxillary palpi 6-jointed; labial palpi 4-jointed.

Stigma very small, inconspicuous or poorly developed, the transverse median nervure not interstitial.....6.

Stigma distinct, well developed, the transverse median nervure interstitial or nearly with the basal nervure.....5.

5. Maxillary joints short, subequal; labial palpi 4-jointed, short, the first two a little stouter and longer than the last two; head seen from in front a little longer than wide, slightly narrowed below, the frontal foveæ distinct, long, linear.....**Prosopis** Fabr.

Basal three joints of maxillary palpi stout, subequal, joints 3 6 much slenderer and clavate; basal joint of labial palpi somewhat longer than the second, joints 2-3 subequal, the last cylindrical.

Stilpnosoma Smith.

6. First joint of maxillary palpi the shortest and stoutest joint, the third slightly the longest, joints 4-5 subequal; first joint of labial palpi the longest, joints 2-4 subequal.....**Meroglossa** Smith.

ERRATA.

Page 55, line 32, for golden *read* pollen.
" 58, " 20, for cleft *read* tuft.
" 61, " 5 from bottom, for *graga* read *graja*.
" 63, " 14, for **Xenogloss** read **Xenoglossa.**
" 66, " 1, *insert* abdomen *after* third.
" 68, " 4, for 16 *read* 15.
" 72, " 13, for mediam *read* median.
" 73, " 11, for Jarine *read* Jurine.

INDEX.

PAGE

A.

Acanthopus. 68
Acanthosmia. 76
Acanthosmiodes. 76
Aceratosmia 75
Agapostemon 91
Aglæ 68
Alcidamea 74
Allodape 82
Amblys 75
Amegilla 60
Ammobates 81
Ammobatoides 81
Ancyla 90
Ancyloscelis 64
Andrena 90
ANDRENIDÆ, Fam. XII 86
ANDRENINÆ, Subfam. I 87
Andronicus 74
ANTHIDIINÆ, Subfam. III 72–78
Anthidium 78
Anthocopa 76
Anthoglossa 94
Anthophora 60
ANTHOPHORIDÆ, Fam. V 58
Apathus = Psithyrus 58
APIDÆ, Fam. I 56
APINÆ, Subfam. II 57
Apis 57
Apista 88
Arctosmia 75
Ashmeadiella 73
Audinetta = Platynopoda 71
Auglochlora 91

B.

Biareolina 83
Biastes 80
BOMBIDÆ, Fam. II 57
Bombomelecta 66
Bombus 57
Brachynomada 69

PAGE

C.

Cacosoma = Corynura 91
Cænonomada 68
Cænoprosopis 82
Callandrena = Biareolina 83
Calliopsis 85
Callomelitta 89
Camptobeum 84
Canpolocana 94
Centris 59–61
Ceratina 69
CERATINIDÆ, Fam. VII 69
Ceratosmia 74
Chalcosmia = Osmia 75
Chalicodoma 78
Chelostoma 73
Chelynia = Chelostoma 73
Chilicola 81
Chrysantheda = Exærete 67
Cilissa = Melitta 89
Clisodon 60
Cockerellia 85
Cœlioxoides 68
CŒLIOXINÆ, Subfam. II 79–80
Cœlioxys 82
Colletes 94
COLLETIDÆ, Fam. XIII 93
Corynura 91
Crocisa 66
Crocisaspidia 68
Ctenioschelus = Acanthopus 68
Ctenoplecta 77
Ctenosmia = Hoplitis 76
Cyaneoderes 70
Cyathocera = Steganomus 77

D.

Dasycolletes 95
Dasypoda 96
Diadasia = Ancyloscelis 64
Diadasiella 64
Didonia 93

PAGE

Dilobopeltis = Euaspis ... 78
Dioxys ... 82
Diphaglossa ... 94
Diphysis = Trachusa ... 73
Dœringiella ... 67
Dufourea ... 83

E.

Ecplectica ... 63
Emphor ... 60-61
Emphoropsis ... 60
Entechnia ... 64
Epeicharis ... 67
Epeoloides ... 63
Epeolus ... 67
Epicharioides ... 67
Epicharis ... 62
Epicolpus ... 61
Epimelissodes ... 63
Epimethea ? = Panurginus ... 85
Epinomia ... 88
Eriades = Heriades ... 73
Ericrocis ... 66
Erythrosmia = Pseudosmia ... 75
Euaspis ... 78
Eucera ... 63
Euglages = Phiarus ... 81
Euglossa ... 58
EUGLOSSIDÆ. Fam. III ... 58
Eulema ... 58
Eunomia = Monia ... 88
Euryglossa ... 95
Eurytis ... 67
Eusynhalonia ... 63
Euthyglossa ... 60
Exærete ... 67
Exomalopsis ... 64
Exoneura ... 82

F.

Florentine ... 67
Furcosmia = Anthocopa ... 76

G.

Gastropsis ... 89
Gyrodroma = Chelostoma ... 73

H.

Habrophora = Habropoda ... 60
Habropoda ... 60
Holcopasites ... 82

PAGE

HALICTINÆ. Subfam. III ... 90
Halictoides ... 83
Halictus ... 92
Helicosmia = Amblys ... 75
Hemihalictus = Dufourea ... 83
Heriades ... 73
Hesperapis = Rhophitoides ... 83
Holcopasites ... 82
Homachtes ... 81
Hopliphora = Eurytis ... 67
Heplitis ... 76
Hoplopasites ... 82
Hoplosmia ... 75
Hylæoides ... 95
Hylæosoma ... 85
Hylæus = Prosopis ... 96
Hypochrotænia ... 80

K.

Koptorthosoma ... 71

L.

Lagobata ... 60
Lamprocolletes ... 94
Leioproctus ... 95
Leiopodus ... 66
Lestis ... 71
Liogastra = Rhathymus ... 67
Liphanthus ... 88
Lipotriches ... 68
Liturgus ... 77
Lucasius = Nomiodes ... 92

M.

Macrocera = Eucera.
Macropis ... 83
Macrotera ... 85
Macroteropsis ... 85
Madrosoma ... 94
Megachile ... 77
MEGACHILIDÆ. Fam. IX ... 71
MEGACHILINÆ. Subfam. II ... 72-76
Megacilissa ... 94
Megaloptera ... 92
Megalosmia ... 76
Melanempis ... 81
Melanosmia ... 75
Melanostelis ... 79
Melecta ... 66

PAGE

Melectoides 67
Melipona 56
MELIPONINÆ, Subfam. I 56
Melissa 67
Melissodes 62–63
Melissoptila = ? Epicharis 62
Melitoma 62
Melitta 89
Melittidia 91
Melittoxena 82
Meliturga 62
Meliturgopsis 62
Meroglossa 96
Mesocheira 67
Mesonychium 67
Mesotrichia 71
Micrandrena 89
Monia 88
Monœca 61
Monumetha 74
Morgania = Homachtes 81
Mydrosoma = Madrosoma 94

N.

Neolarra 81
Neopasites 81
Neoperdita 85
Nomada 69
NOMADIDÆ, Fam. VI 64
Nomadita ? = Melittoxenna 82
Nomadopsis 84
Nomia 88
Nomiodes 92
Nothosmia 75

O.

Œdiscelis 80
Œstropsis = Gastropsis 89
Omachtes = Homachtes 81
Osiris 68
Osmia 75
OSMIINÆ, Subfam. I 71–72
Oxæa 71
OXÆINÆ, Subfam. II 70
Oxystoglossa = Auglochlora 91

P.

PANURGIDÆ, Fam. XI 82
Panurginus 85
Panurgus 85

PAGE

Paracolletes 94
Paradioxys 82
Paramegilla 60
Parandrena 83
Paranomia 88
Parasphecodes 91
Parevaspis 80
Pasiphæ 95
Pasites 81
Perdita 85
Perditella 84
Perditomorpha 86
Phiarus 81
Phileremus = Ammobates 81
Phileremulus 81
Philoxanthus 84
Platynopoda 71
Pleistotrechia = Ancyla 90
Podalirius = Anthophora 60
Proapis = Prosopis 96
PROSOPIDÆ, Fam. XIV 95
Prosopis 96
Protandrena 88
Protostelis 79
Psænythia 88
Pseudopanurgus = Panurginus 85
Pseudepeolus 80
Pseudomelecta 66
Pseudosmia 75
PSITHYRIDÆ, Fam. IV 58
Psithyrus 58
Ptiloglossa 89
Pyrrhomelecta 66

R.

Rhathymus 67
Rhopalictus = Corynura 91
Rhophites 83
Rhophitoides 83

S.

Saropoda 59
Schmiedeknechtia 81
Schœnherria = Xylocopa 71
Scrapter 84
Scrapteroides 85
Serapis 78
Sphecodes 93
SPHECODINÆ, Subfam. III 92

PAGE

Sphecodogastra 92
Sphecophala 89
Spiholiella 84
Steganomus 77
Stegocephalus 85
STELIDIDÆ, Fam. X 78
STELIDINÆ, Subfam. I 79
Stelidomorpha 80
Stelis 80
Stenotritus 90
Stilpnosoma 96
Svastra = Xenoglossa 61
Synhalonia 63
Systropha 90

T.

Temnosoma 93
Tetragona 57
Tetralonia 61
Tetraloniella 61
Tetrapædia 64

PAGE

Thalestria 66
Thanmatosoma 77
Trichochostoma 91
Trachusa 73
Tridentosmia 75
Trigona 57
Trophocleptria 67
Trypetes 73

X.

Xenoglossa 61
Xenoglossodes 63
Xylocopa 71
XYLOCOPIDÆ, Fam. VIII 70
XYLOCOPINÆ, Subfam. I 70

Z.

Zacesta 73
Zacosmia 65
Zadontomerus 69

REVISION OF THE LATHRIDIIDÆ OF BOREAL AMERICA.

BY H. C. FALL.

In the Summer of 1897 there appeared in the Revue d'Entomologie a paper entitled "Essai de Classification General des Lathridiidæ, Avec le Catalogue Systematique et alphabetique de toutes les espèces du Globe—par le R. P. fr. Mie Jos. Belon O. P." This paper, which, by the way, did not come to hand till the following year, briefly summarizes the results of the author's study of these insects extending over a period of some twenty-five years, and is, from a generic and bibliographic standpoint, of the greatest value to every student of the family. It is, however, of little or no service to the American student or collector as an aid to the identification of his own species, since, with few exceptions, the author's acquaintance with the North American fauna is too limited to permit the incorporation of our species into his tables.

The following pages are the result of an effort to do, in some degree, for our fauna that which the labors of Reitter and Belon have accomplished in Europe, and although much had been done toward this end before the receipt of the essay above mentioned, the progress of the work was greatly stimulated, and its completion hastened thereby.

In addition to the difficulties always incident to the examination and description of such minute forms, there have been three others which have combined to discourage the attentions of systematists to the Lathridiidæ. First, the small size and frequently monotonous aspect of the insects themselves have caused them to be neglected by collectors; again, the fact that so many species are widely distributed through the agency of commerce, would require a more extended acquaintance with exotic species than is usually necessary; and finally, the impossibility of recognizing from the description the greater part of the numerous species of Mannerheim and Motschulsky. The first two difficulties named are not serious, but the last is practically insurmountable. The descriptions of both these authors touch only the more obvious superficial characters, neglecting almost entirely the under surface of the body, which is of great importance, as well as the finer details of structure, including sexual characters,

upon which we must often depend for the separation of closely allied forms. It is certain that many of their species can never be identified without an examination of the types, a possibility so remote, even if they be in existence, that it is believed better to risk the creation of a few synonyms in the attempt to establish order, than to leave the family indefinitely in obscurity.

The material which has served as the basis of this revision comprises, besides my own, the Horn, Hubbard and Schwarz, Wickham, Blanchard, National Museum and Cambridge Museum collections, supplemented by typical specimens of many European species from Reitter and Belon. My heartiest thanks are due to the owners or curators of the above collections for the service thus rendered. Especial mention should be made of the Hubbard and Schwarz collection, which alone comprises about 1000 specimens, and is by far the richest accumulation of Lathridiidæ in this country. For the privilege of studying it in its entirety and at my leisure, Mr. Schwarz with great kindness undertook the labor of transferring to suitable boxes, packing and shipping to me this collection, and this at a time when seriously incapacitated by ill health. I wish also to express especial appreciation of the rare kindness of Mr. Belon, who has forwarded to me for examination his unique types of *Enicmus cordatus* and *E. ferrugineus*, and who has also sent me his excellent monograph of the Lathridiidæ of France, and contributed generously to my cabinet.

In its general features the following arrangement of genera is nearly in accord with that adopted by Belon; the discovery, however, of hitherto unobserved characters, or the different estimate placed upon others, has resulted in a certain amount of deviation from the lines there followed. The reasons for these changes are, I believe, in all cases set forth, and their adoption or rejection is left to the judgment of those for whom the work is prepared.

The simple outline sketches on the accompanying plates have been drawn for the most part with the aid of the camera lucida, and it is hoped they will prove of material assistance in the identification of species. Many details regarding form and relative dimensions of parts have been omitted or abbreviated in the descriptions in the belief that such information may be more quickly and satisfactorily obtained from a figure than by the perusal of a labored description.

In a review of a strictly faunal nature like the present, it is probably not necessary to state, yet it is important to bear in mind,

that the characters used and statements made are to be construed as applying only to the fauna in question. They may be, and in general are, capable of a much wider application, but it is not safe to assume this.

The following characterization of the family is as full as need be for practical uses.

It will be observed that *Monoedus* has not been included in the present revision. According to Dr. Sharp, it almost certainly belongs to the family Adimeridæ. My opportunities for investigation have not been sufficient to enable me to form any conclusions upon this subject, but the opinion of so eminent an authority may probably be safely accepted.

Small or minute insects, rarely exceeding 2.5 mm. in length; body varying in form from broadly oval to linear, and from strongly convex to depressed; color usually rufotestaceous or brownish, but varying from pale yellowish testaceous to black, rarely with distinct markings and never (in our fauna) at all metallic; glabrous or virtually so almost throughout the Lathridiini, pubescent in the other tribes, the pubescence never very dense and arranged serially on the elytra except in the Merophysiini.

Head horizontal, usually more or less transverse, rarely distinctly elongate (*Adistemia* and some *Cartodere*), smooth or punctate, often sulcate or carinulate.

Mentum large, usually transverse and strongly punctate; about as long as wide in *Fuchsina*, longer than wide and smooth in *Dasycerus*.

Mandibles small, not prominent, generally concealed by the labrum.

Maxillæ with two lobes.

Palpi short and difficult to observe; the maxillary with four, the labial with two or three joints; last joint oval or subconical, longer than the preceding (very elongate and acicular in *Dasycerus*), the basal joints scarcely visible, pseudobasal joints robust.

Labrum short, strongly transverse, relatively large in the Corticariini; usually narrower (in a transverse sense) than the epistoma, rarely (*Cartodere elegans*, *Adistemia* and *Revelieria*) wider than the epistoma and embracing it at sides; its front margin usually in some degree sinuate, but often arcuate or truncate.

Epistoma short, on the same plane as the front, and separated from it by a fine arcuate suture in the Merophysiini and Corti-

cariini; on a somewhat lower plane and separated from the front by a deeper suture in Dasycerini and Lathridiini.

Antennæ clavate (capillary in *Dasycerus*), 9–11-jointed, club 3 or rarely 2-jointed; inserted anteriorly at the sides of the front, the base sometimes a little concealed by the frontal margin. They are usually shorter than the head and prothorax, but occasionally reach or even pass the base of the pronotum. The first two joints are always larger than those following, the second as a rule somewhat narrower than the first; funicular joints subequal or very slightly increasing in width and gradually shorter; club usually more or less abruptly formed, the first two joints either elongate or transverse, the first generally longer than the second, the last joint more elongate and frequently obliquely truncate.

Eyes normally large and prominent, small or minute in *Holoparamecus*, *Cartodere*, *Metophthalmus*, *Adistemia* and *Belonia*, entirely wanting in *Fuchsina*. They are situated at, or much more frequently a little in advance of the hind angles, thus leaving more or less distinct tempora, and are lateral in all genera except *Metophthalmus*, in which they are concealed from beneath by the explanate side margin of the head.

Prothorax of variable form, nearly always distinctly wider than the head, and rarely as wide as the elytra; the margin very often (Lathridiini and Corticariini) finely crenulate or denticulate, especially toward the hind angles, and occasionally (*Coninomus* especially) with a whitish membranous border, which may become irregular through wear, or even entirely lost. Surface evenly convex, or variously marked with foveæ or costæ; by far the greater number having either a median subbasal fovea or a more or less distinct transverse impression.

Scutellum ordinarily distinct, but small and transverse; indistinct or entirely lacking in a few genera.

Elytra oblong, oval, or sublinear; entirely covering the abdomen except in a few species of *Melanophthalma*, in which they are slightly truncate or subtruncate, revealing the tip of the abdomen; each 6–8 punctate-striate, except in the Merophysiini, where the punctuation is confused, and in *Revelieria* and *Fuchsina*, where they are 12 or 13 in number and more or less irregular.

Prosternal side pieces not divided, the suture separating them from the prosternum nearly or quite obliterated. This suture, though faint, is traceable in *Holoparamecus*. Coxal cavities sepa-

rated by a lamina of variable width (except in *Dasycerus*), open behind in *Holoparamecus* and *Dasycerus*, closed in the two larger tribes. In *Lathridius* the prosternum fails to reach the posterior margin, allowing the epimera to coalesce on the median line. In *Metophthalmus* the flanks are grooved near the margin for the reception of the outer joints of the antennæ.

Mesosternum short, the side pieces generally distinct.

Metasternum longer than the mesosternum, sometimes longer, sometimes shorter than the first ventral segment; simply punctate and with or without a longer or shorter fine impressed median line in *Holoparamecus* and Corticariini; variously foveate and sulcate in most Lathridiini, quite often with deep post-coxal pits with plicate or wrinkled margins.

Abdomen consisting of five or six segments, the first (except in *Dasycerus*) as long as the two or three following united; segments 2–5 subequal, the last sometimes a little longer; the sixth when present generally much smaller. Segments free, except in *Adistemia*, where the first is connate with the metasternum, the suture being entirely obliterated between the coxæ.

Front coxæ conical, prominent, more commonly distinctly separated, but contiguous or subcontiguous in *Dasyceras*, *Adistemia* and many of the Corticariini.

Middle coxæ rounded and less prominent (except *Dasycerus*), distinctly separated except in *Adistemia*.

Hind coxæ transverse, not prominent, more or less widely separated, their cavities nearly or quite reaching the side margin. In *Dasycerus*, however, the coxæ are nearly in contact at their inner angles, while in *Adistemia* they are small, a little prominent, their cavities falling far short of attaining the epipleuræ.

Legs moderate; trochanters usually small, but very long in *Belonia;* femora robust or slender; tibiæ straight or slightly arcuate, quite uniformly somewhat slender, and gradually wider apically, except in *Dasycerus*, where they are widest at or a little before the middle; the apex without spurs; tarsi 3-jointed, the first two joints comparatively short, but differing in relative proportions, the last joint usually about equal to the two preceding combined; claws simple.

External sexual marks are not infrequent and affect most commonly the legs and abdominal apex.

The early stages of these insects are practically unknown, and

but little more has been published concerning their habits in the mature state. They are known to occur in vegetable detritus, under bark and stones, in commercial products and on various plants.

The four primary or tribal divisions into which our fauna is separable may be thus distinguished:

Anterior coxal cavities open behind.
- Front coxæ separated by a prosternal lamina, antennæ clavate, body not costate ..... MEROPHYSIINI.
- Front coxæ contiguous, their cavities confluent, antennæ capillary, body costate ..... DASYCERINI.

Anterior coxal cavities closed behind.
- Epistoma on a lower plane than the front and separated from it by a deep suture; body often costate, glabrous or virtually so (except *Lathridius productus* and *Enicmus hirtus*), the hairs when present sparse and erect; front coxæ distinctly separated (except in *Adistemia*) ... LATHRIDIINI.
- Epistoma on the same plane as the front, separated from it by a distinct but scarcely impressed suture; body never costate, always pubescent, the hairs more or less inclined or recurved; front coxæ less distinctly separated, usually contiguous or nearly so ..... CORTICARIINI.

Tribe I. MEROPHYSIINI.

HOLOPARAMECUS Curtis.

Of the nine genera included by Belon in this tribe, the present alone has thus far occurred in North America. Its principal characters are detailed below, and with few exceptions are those of the tribe to which it belongs.

Front smooth, epistoma on the same plane and separated by a fine arcuate suture; eyes rather small; labial palpi 3-jointed; antennæ 9–11-jointed in our species, club 2-jointed. Prothorax narrowed behind. Elytra elongate-ovate, widest in front of the middle; body devoid of costæ, very finely punctulate and with short, sparse, fine pubescence; elytra with an entire sutural stria, but without series of punctures. Front coxæ distinctly separated, their cavities open behind; middle coxæ more widely separated; first tarsal joint distinctly longer than the second, the third joint subequal to the first two together.

Our six species divide naturally into two groups, representing two of the four subgenera entertained by Belon. In the first group—*Holoparamecus* proper—besides the characters named in the table below, the abdomen consists normally of five visible segments, the sixth being rarely very slightly protruded; the first ventral is never quite as long as the three following combined, and the longitudinal

median impressed line of the metasternum is abbreviated or entirely wanting. In the second group—*Calyptobium* Aubé—the sixth ventral in our three species is, in every specimen examined, distinctly and apparently normally exposed; the first ventral is as long as the three following combined, and the metasternum bears an entire median impressed line.

Two species—*singularis* and *pacificus*—have stood on our lists for many years; of the former I have seen no native specimens and its occurrence with us is certainly open to doubt. The only localities thus far named are New York and Yuma. The former is based upon a specimen in the LeConte collection, which, on examination, I find to be *kunzei*, and as this species also occurs in California, the Yuma specimens are doubtless the same thing. As *singularis*, however, is a cosmopolitan species, it will quite surely be found here sooner or later, and it will therefore be described and included in the table. Our species separate easily in the following manner:

Antennæ 9-jointed in the ♂, 10-jointed in the ♀; pronotum longitudinally bistriate at base, hind angles not foveate.

Subgenus **Holoparamecus.**

Eyes small, distant by about their own diameter from the antennæ; pronotum without discal fovea; metasternum without median impressed line.

Form broad, elytra convex, metasternum longer than the first ventral segment, first joint of antennal club longer than wide. .....**ragusæ.**

Form more slender, elytra less convex, metasternum scarcely as long as the first ventral segment, first joint of antennal club not longer than wide.....**singularis.**

Eyes larger, distant by about half their diameter from the antennæ; pronotum with small discal fovea; metasternum with median impressed line in apical half.....**kunzei.**

Antennæ 11-jointed in both sexes; pronotum not bistriate at base, the base more or less broadly impressed, the hind angles foveate.

Subgenus **Calyptobium.**

Hind angles of prothorax not carinate.

Tempora nearly as long as the eyes, surface feebly shining....**pacificus.**

Tempora very short, surface shining.....**floridanus.**

Hind angles of prothorax carinate.....**caularum.**

H. ragusæ Reitt.—Quite robust, testaceous, finely but distinctly punctate throughout, the punctures of the pronotum and prosternum being especially strong and close for the genus. Antennæ with the intermediate joints scarcely as wide as long, the first joint of club obconic, longer than wide, and much longer than the terminal joint. Eyes small, distant by about their own diameter from the antennæ, the tempora very short. Prothorax wider than long, widest a little behind the apex, sides rounded in front, thence oblique and scarcely at all sinuate to the hind angles, which are slightly obtuse; disk moderately convex

in front without median fovea; base flatter and broadly depressed each side, the longitudinal striæ wide and connected behind their anterior extremities by a feeble transverse impression; median basal carina nearly obsolete, but traceable in certain lights; hind angles not carinate, the border merely abruptly depressed. Elytra convex, without humeri, rather strongly narrowed to apex, which is parabolically rounded. Front coxæ separated by nearly half the coxal width: metasternum longer than first ventral segment and without impressed line. (Pl. III, figs. 1 and 1*a*). Length 1–1.2 mm.

Hab.—Pennsylvania, Missouri.

A small series in the Horn collection is all that I have seen. The comparatively robust form and convex elytra without humeri are sufficient to distinguish this species at a glance from any of its American congeners. The punctuation of the pronotum is closer and stronger than usual, the prosternal side pieces are, however, subimpunctate, and the metasternum and abdomen are finely, sparsely punctulate as in the other species.

H. singularis Beck.—This species, as will be seen by the figure, is intermediate in form between *ragusæ* and *kunzei*. It is more slender and less convex than the former, but is not distinctly depressed as is the latter. The humeri are nearly wanting, the surface is quite shining, the punctuation very sparse and fine on the pronotum, a little more distinct on the elytra, and almost as strong on the prosternum as in *ragusæ*. The antennæ are much as in *kunzei*. Eyes small, distant their own diameter from the antennæ, tempora very short. Sculpture of the base of the pronotum much as in *kunzei*, but the basal transverse line is better defined, the median longitudinal carina obsolete, the hind angles not carinate. Front coxæ separated by about two-fifths the coxal width. The metasternum is scarcely as long as the first ventral segment; a character of importance, since in all our other species it is visibly longer than the first ventral. Metasternum without median impressed line. (Pl. III, figs. 2 and 2*a*). Length 1.2 mm.

Hab.—This is a common species throughout Europe, and has been found in various parts of Asia and Africa. It has been recorded from New York and Yuma in our territory; but, as has been already remarked, the specimens so referred were quite surely *kunzei*; its occurrence therefore in our fauna has yet to be verified.

H. kunzei Aubé.—Depressed, yellowish or reddish testaceous, very finely and sparsely punctate, both above and beneath, pubescence fine, short and inconspicuous. Antennæ passing the middle of the prothorax; first two joints elongate, subequal, the first a trifle stouter, third longer than wide, following joints about as wide as long; first joint of club very slightly wider and longer than the terminal joint. Eyes moderate, distant from the antennæ by about half their diameter, tempora small, the eyes nearly contiguous to the prothorax in repose. Prothorax a little more than one-fourth wider than long, surface flattened, widest a little behind the front angles, sides sinuate posteriorly, hind angles a little obtuse; disk with a median punctiform fovea in front of the middle, a longitu-

dinal basal stria each side nearer the margin than the middle, the striæ connected near their anterior extremities by a transverse impressed line, which is obtusely angulate posteriorly, and again by a less distinct impressed line close to the basal margin; median line from the anterior transverse impression to the base depressed and very finely carinulate; hind angles with a very fine carina close to and parallel with the margin. Elytra feebly convex, three times as long as the thorax, tip broadly obtusely rounded. Front coxæ separated by about two-fifths the coxal width, middle coxæ by fully the coxal width; metasternum longer than the first ventral segment and with an impressed median line in the apical half. (Pl. III, figs. 3 and 3*a*). Length 1–1.2 mm.

Hab.—New York; California (Los Angeles Co.; Riverside).

Seven examples are before me, differing scarcely at all. The carina of the thoracic angles is very fine, and so close to the margin as to be with difficulty distinguished when viewed from above.

H. pacificus Lec.—Elongate, rufotestaceous, very minutely indistinctly punctulate; pubescence very fine, short and sparse; surface moderately shining but not polished, a little dulled by finer sculpture apparently. Head a little narrower than the prothorax, eyes rather small, separated from the antennal foveæ by about half their own diameter; tempora slightly shorter than the eyes, which usually appear to be distant from the prothorax by about their own diameter. Antennæ, when directed backward, not quite reaching the transverse impression of the prothorax, ninth joint a little wider than the preceding, joints of club transverse, the last but little shorter than the tenth, though distinctly narrower. Prothorax subcordate, a little wider than long, sides rounded in front, sinuate behind; hind angles a little obtuse, not carinate above, but with a small fovea extending obliquely inward; the disk between these fovea broadly impressed and bearing near the middle two approximate small foveæ, which are best defined when viewed obliquely from behind. Elytra widest at about one-third from base, thence obliquely narrowed both before and behind; apex subtruncate, outer angles rounded. Anterior coxæ separated by about one-third the coxal width, middle coxæ by fully their own width. First ventral segment as long at the middle as the next three together, fifth about as long as the two preceding united; sixth more or less exposed in all specimens examined. Femora stout, elavate; tibiæ gradually wider to apex. (Pl. III, figs 4 and 4*a*). Length 9–1.4 mm.

Hab.—California, Los Angeles Co. (Coquillet); Pomona, under bark of decaying log in April; Palm Springs, about grass roots, and in debris along the Colorado River (Hubbard); Arizona, Tucson, in decaying *Cereus giganteus*, January (Hubbard); Santa Rita Mts., in decaying *Dasylirion wheeleri*, May (Schwarz).

Varies somewhat in the form of the prothorax, this being usually more or less transverse, but occasionally nearly or quite as long as wide.

H. floridanus sp. nov.—Rufotestaceous, elytra with an ill-defined darker transverse shade behind the middle; surface polished and not evidently punctate. Tempora short. Hind angles of thorax not carinate, moderately deeply foveate, the transverse subbasal impression narrow, sharply defined, anteriorly arcuate each side, instead of straight as in *pacificus* and *caularum*. Length 1 mm.

Hab.—Florida (Key West).

Described from a single example in the Horn collection. The form is a trifle less slender than in *caularum*, but the chief distinguishing characters are the impunctate surface and the form of the transverse subbasal impression of the pronotum, which is more nearly linear and lacks the two small median foveæ, which are always more or less evident in both *pacificus* and *caularum*.

H. caularum Aubé.—Yellowish testaceous, punctuation very fine, but a little closer and more sharply defined than in *pacificus;* surface polished. Tempora very short, merely a raised margin not longer than one-fifth or one-sixth the diameter of the eye; eyes therefore nearly contiguous to the prothorax when the head is retracted. Hind angles of the pronotum with a fine, short carina exterior to the lateral basal foveæ, the discal transverse impression with its two median foveæ nearly as in *pacificus*, but more sharply defined. Length 1.1-1.3 mm.

Hab.—Five specimens are before me, one taken by Coquillet (Los Angeles Co.), the others by Dr. Fenyes at Pasadena, flying and under bark in February, and again in September.

Caularum is much like *pacificus*, but is at once separable by the polished surface, more distinct punctuation, nearly obsolete tempora, and carinate hind angles of the pronotum; the lateral foveæ of the pronotum are also longer, deeper and less obviously oblique than in *pacificus*.

Tribe II. Dasycerini.

This tribe contains only the single genus *Dasycerus*, represented by five species in the European fauna and two in our own. Notwithstanding the opinion expressed by Mr. Belon, based, it must be confessed, upon a study of the genera of the globe, that *Dasycerus* should be considered as merely an aberrant member of the tribe Lathridiini, it has seemed to me that the assemblage of characters possessed by this singular genus is worthy of the greater emphasis here accorded it. So far as I can learn all the European writers either assert or assume that the front coxal cavities are closed behind throughout the family. As a matter of fact they are open behind in both *Holoparamecus* * and *Dasycerus*. In addition to the open coxal cavities, the prosternal process is lacking in *Dasycerus*, which in both these respects differs radically from every other genus of the

* I do not know if this holds good throughout the Merophysiini, but think it very probable. It is so in *Merophysia*, which is the only genus I have been able to test.

Lathridiini. Add to this the capillary antennæ, the club consisting of nodiform enlargements of the intermediate portions of the outer joints (except the terminal joint), the very long aciculate terminal joint of the maxillary palpus, the abdomen composed of six segments in both sexes, with the basal segment scarcely longer than the second, all of which characters are foreign to the remaining genera of the tribe, and the setting apart of *Dasycerus* as a distinct tribe would appear to be justified. There are several other characters possessed by *Dasycerus*, which, if of themselves of minor importance, are yet in the aggregate quite significant. The mentum, which everywhere else is more or less strongly transverse and deeply sculptured, is here fully as long as broad, its surface polished and impunctate. The tibiæ instead of widening gradually to the apex, as in all other genera, are widest at or near the middle, whence they are narrowed toward the apex. The form of the prothorax, the membranous and ciliate elytral margin, and finally the sculpture and vestiture of the entire upper surface are all peculiar to the genus in question. Our two species, one from each side of the continent, are quite closely related; they may be readily separated by the following short descriptions.

D. carolinensis Horn.—Brown; head triangular, base truncate with rounded angles, tempora about as long as the eyes; the latter globose, very prominent, but a little concealed from above by the elevated side margins of the front. Prothorax transversely hexagonal, side margins membranaceo-explanate, disk transversely impressed behind the middle, longitudinally costiform each side the median line, both before and behind the transverse impression. Elytra broadly oblong-ovate, humeri rather narrowly rounded; each elytra with three sharply defined entire costa, their summits with a close set series of stout scale-like elevations, each of which bears a recurved bristle; intercostal intervals biseriately punctate, those between the first and second, and second and third costæ with an irregular intermediate line of more distant punctures. Mesosternum with a median longitudinal raised line or carina, which extends throughout its length and between the middle coxæ, which are narrowly separated. (Pl. III, figs. 5 and 5*a*). Length 1.75 mm.

Hab.—North Carolina, Morgantown (Morrison), Retreat and Round Knob (Hubbard and Schwarz).

The head and prothorax are apparently granulate, the granules forming the pedicels for the yellowish hairs of the surface. The margin of the elytra in all specimens seen is without membranous border, and is similar in structure to the discal costæ. In two females each sutural costa bears near the apex an acute process

which is bent toward and is nearly in contact with its fellow at tip. The suture is not distinctly elevated.

D. angulicollis Horn.—Very similar to *carolinensis*. The sides of the thorax are a trifle more sharply angulate; the intercostal spaces are more regularly triseriately punctate (the interval between the suture and the first costa bears only two series of punctures in both species), the intermediate line of punctures being here nearly as regular and as closely placed as the other two. The elytra are more oval, the humeri being more broadly rounded and the sides less parallel at the middle. The elytra, as well as the prothorax, are provided in fresh specimens with a membranous border, in which the marginal ciliæ may be seen by transmitted light. The mesosternum is not distinctly carinate on the median line. The females lack the peculiar processes of the sutural costæ noted in the preceding species. Length 1.75 mm.

Hab.—California. The only specimens that I have seen with exact locality label were collected by Dr. Fenyes at Monterey.

D. grouvellei Belon is described from the Mariposa region of California. The characters given do not seem to me sufficient for its separation, in fact they are for the most part based on a misapprehension of *angulicollis*, which Belon had not seen. I have therefore followed Dr. Horn in regarding it as a synonym of *angulicollis*.

Tribe III. Lathridiini.

The more important characters of this tribe are: Epistoma (except very rarely), wider than the labrum, and on a somewhat lower plane than the front, from which it is separated by a strongly marked suture. Front more or less coarsely or rugosely sculptured, often sulcate or carinate. Antennæ 11-jointed (except in some *Metophthalmus*), club 2 or 3-jointed. Prothorax with pronounced sculpture, often costate and variously foveate or impressed; side margins without denticles, properly speaking, but often lightly crenulate. Elytra each 6–8 punctate-striate (except *Revelieria*), intervals frequently in part more strongly elevated or even carinate. Anterior coxal cavities closed behind and separated by a prosternal lamina, which (except in *Adistemia*) is distinctly visible. Middle coxæ more widely separated than the anterior, except in *Adistemia*. Abdomen composed of five segments in both sexes. In form of body, details of sculpture and coloration there is great diversity. The vast majority of species are glabrous or subglabrous, the only notable exceptions being *Lathridius productus* and *Enicmus hirtus*, both of which are thus far of very rare occurrence in this country.

Table of Genera.

Pronotum with dorsal costæ.
  Eyes entirely superior; elytra connate.....**Metophthalmus.**
  Eyes lateral; elytra not connate.
    Prosternum not reaching the posterior border of the prothorax, the epimera coalescent on the median line.....**Lathridius.**
    Prosternum reaching the hind margin of the prothorax, separating the epimera.....**Coninomus.**
Pronotum without dorsal costæ.
  Elytra not connate.
    Eyes large, not very distant from the antennæ, scutellum distinct.
Enicmus.
    Eyes small or minute, remote from the antennæ; scutellum indistinct.
      Trochanters normal.
        Middle coxæ not contiguous.....**Cartodere.**
        Middle coxæ contiguous.....**Adistemia.**
      Trochanters long, cylindrical.....**Belonia.**
  Elytra connate.....**Revelieria.**

METOPHTHALMUS Woll.

Body minute, subdepressed, glabrous; pronotum foveate and sulcate; elytra with six or eight series of large foveiform punctures. Head bicostate, sides with broad flattened margin; eyes very small, composed of few lenses, widely distant from the antennæ and entirely superior. Antennæ 9–11 jointed, club 2 or 3-jointed (3-jointed in all our species). Margins of head, thorax and often of the humeri finely serrulate or crenulate. Scutellum wanting; wings obsolete. Coxæ more or less separated; abdomen with five segments, the first nearly or quite as long at middle as the two following united. Legs rather short; femora moderately stout; tibiæ straight, gradually broader toward the apex; tarsi with the first two joints nearly equal in length, third equal to the first two together; claws simple.

The species of this genus possess a very uniform and characteristic facies, which renders them at once recognizable. Unless secured immediately after disclosure from the pupæ, more or less of the pronotum, under surface, and in certain species, of the elytra, is usually covered with a chalk-like indument composed of cryptogamic dust or debris, which it is difficult to remove. The presence or absence of this indument must, in the nature of things, be in some degree fortuitous, and in only one of our species—*albosignatus*—is its disposition so constantly peculiar as to warrant its use as a specific character. In the Essay already mentioned Mr. Belon restricts *Metophthalmus* to those species having 9 or 10-jointed an-

tennæ with 2-jointed club, and erects a new genus—*Metatypus*—to contain a small number having the antennæ 11-jointed with 3-jointed club. Following this method of division with our species, *americanus* would be a *Metophthalmus*, *trux*, *rudis* and *albonotatus* would fall in *Metatypus*, while *parviceps* with its 10-jointed antennæ and 3-jointed club would have to have another genus established for its reception. Such a procedure, however, would be entirely unwarranted, and in view of the striking uniformity in every other significant detail of both structure and facies, it is difficult to find an excuse for even subgeneric titles Indeed, the course here pursued by Mr. Belon appears to be quite the opposite to that followed elsewhere in similar cases, and if we would be consistent *Metatypus* must, I think, share the fate of *Tomyrium*, *Tocalium*, *Calyptobium* and others.

Our five species are easily separable as follows:

Antennæ 10-jointed.
  Head broader, sides of prothorax not distinctly angulate at middle, humeri subdentiform..... **parviceps.**
  Head narrower, sides of prothorax angulate, humeri rounded.**americanus.**
Antennæ 11-jointed.
  Elytra with eight rows of punctures.....**rudis.**
  Elytra with six rows of punctures.
    Size larger, elytra at base wider than the contiguous base of the prothorax. **trux.**
    Size smaller, elytra at base equal in width to the contiguous base of prothorax. **albosignatus.**

M. parviceps Lec.—Ferruginous. Head wider than long, sides strongly rounded, distinctly serrulate. Antennæ 10-jointed, club 3-jointed. Prothorax nearly one-half wider than long; sides usually broadly rounded at the middle, a little more strongly convergent before than behind, margin serrulate; disk with the usual sculpture, viz.: transversely trifoveate on the anterior half, the lateral foveæ larger and more vague than the intermediate one; rather deeply transversely sulcate posteriorly; the sides of the median fovea are more or less elevated anteriorly, and these with two more approximate tubercles at the middle of the base are usually the only portions of the disk not concealed by the cryptogamic indument. Elytra wider at base than the contiguous base of the prothorax, the humeral angles subdentiform and crenulate for a short distance, sides not or scarcely perceptibly angulate; disk of each with six series of large foveiform punctures, the intervals very narrow and alternately a little more prominent. Front coxæ separated by about half the coxal width, middle coxæ by the coxal width. (Pl. III, figs. 6 and 6*a*). Length 1–1.2 mm.

Hab.—Described by LeConte from a single specimen taken at San José, Cal. The five specimens now before me are from Alameda and San Mateo, some forty miles farther north.

M. americanus Mots.—This species, which was taken by Motschulsky about the foot of trees at Mobile, Ala., remains unknown to us. The antennæ are not mentioned in the description, but we are to infer from the generic diagnosis that they are 10-jointed. The characters mentioned in the table are the only ones contained in the description that are serviceable for a comparison with *parviceps*, which alone of our other species has 10-jointed antennæ. Length "½ lin.; width ⅕ lin."

Hab.—Alabama (Mobile).

M. rudis sp. nov.—Of same size, color and appearance as *parviceps*, except in following particulars: Head less transverse, the sides less strongly rounded. Antennæ 11-jointed. Prothorax with sides a little less evenly rounded and less convergent behind. Elytra each with eight rows of foveate punctures, and therefore with three elevated intervals instead of two. The two lateral rows of punctures coalesce into a single row toward the base. (Pl. III, fig. 7).

Hab.—California (Ojai Valley; Los Angeles; Panimint Valley). Specimens were taken by me in the Ojai Valley in March, from the interior of a large woody fungus attached to the trunk of trees.

M. trux sp. nov.—Size, color and sculpture of *parviceps*. Head less transverse; antennæ 11-jointed. Prothorax angulate at sides, the margin slightly concave behind the angulation. Elytra a little wider at base than the contiguous base of the prothorax, but less conspicuously so than in *parviceps;* the side margin, as viewed from above, a little more evidently angulate behind the humeri. Front and middle coxæ distinctly less widely separated than in *parviceps*. (Pl. III, fig. 8).

Hab.—Texas (Columbus); California (San Benardino Mts.). Two examples from the former locality, taken by Mr. Schwarz in dry debris of an old cottonwood tree, and one not appreciably different, taken by myself in the latter locality on the under side of a log in a slightly moist situation.

M. albosignatus sp. nov.—Dark brown when mature, the chalky deposit affecting more or less the margin of the elytra and presenting behind the middle a conspicuous fascia, which is more or less interrupted at the suture. Head longer than wide, sides feebly arcuate, a little convergent. Sides of thorax strongly angulate and distinctly concave behind, parallel for a short distance before the base; hind angles right; margin feebly or scarcely crenulate. Sculpture of pronotum more pronounced than usual. Elytra at base not wider than the contiguous base of the prothorax, sides conspicuously angulate before the middle. Front and middle coxæ more narrowly separated than in any other species. (Pl. III, fig. 9). Length 1 mm. or slightly less—our smallest species.

Hab.—Florida (Biscayne and St. Petersburg). Taken rather abundantly at the former locality under moist bark of the Mastic tree (*Sideroxylon mastichodendron*), by Mr. Schwarz, and at St. Petersburg under wood chips on the shore of Tampa Bay by Mr. Hubbard.

LATHRIDIUS Herbst.

Body nearly or quite glabrous (except *productus*), shining, castaneous or brown. Head about as wide as long, rugosely punctate and canaliculate; epistoma depressed in arc and on a lower plane than the front, labrum broadly rounded; eyes moderate in size, very prominent; tempora subparallel and one-half to three-fourths as long as the eyes; antennæ proportioned as usual, club not very abruptly formed, usually 3-jointed, 2-jointed in *breviclavus*. Prothorax as long or a little longer than wide, front angles more or less lobed, sides sinuately convergent to a point near or a little beyond the middle, thence divergent to base; disk longitudinally bicostate. Elytra fully twice as wide as the prothorax, broadly ovate, apex somewhat pointed; strongly punctate-striate, impressed behind the base, at the middle of the seventh stria and as usual on the suture at the apical fourth. Under surface nearly or quite impunctate throughout. Prosternum excavate before each coxa and with the sides deeply transversely impressed, both before and behind; the intercoxal process extending a short but slightly variable distance behind the coxæ, beyond which the epimera are coalescent on the median line. Metasternum with deep post-coxal foveæ, from which radiate short rugæ, which are much less developed than in many species of *Enicmus*. Middle coxæ separated by their own width or more. Abdomen with five segments in both sexes, the first as long as the next two together, the last four subequal. First joint of tarsi distinctly shorter than the second. As in the case of the European species, sexual characters are present in some of our species, but entirely lacking in others.

The forms which appear worthy of specific standing in the material before me are thus separable:

Elytra with a series of erect hairs on each interspace..... **productus.**
Elytra entirely glabrous, or with the hairs very fine, short and inconspicuous.
  Elytra rather strongly produced at tip; size large..... **lardarius.**
  Elytra not or scarcely produced at tip.
    Antennal club 2-jointed; prothorax scarcely narrower at middle, the sides nearly parallel behind the broadly prominent front angles. **breviclavus.**
    Antennal club 3-jointed; prothorax more or less narrowed at middle.
      Tempora very long, $\frac{2}{3}$ to $\frac{3}{4}$ the length of the eye; seventh elytral interval not carinate in basal half, at most a little more convex.
        Males with the front and middle tibiæ slightly bent at the tip, and with a minute tooth on the inner side near the apex; anterior femora with a short spine close to the trochanters..... **armatulus.**

Males with the front tibiæ alone toothed, the femora unarmed. **montanus.**

Tempora distinctly shorter, about ½ the length of the eyes; discal costæ of the pronotum more strongly developed; no external sexual modifications.

Seventh (humeral) interval of elytra usually very distinctly carinate to beyond the middle. **costicollis.**

Seventh interval of elytra not carinate, though usually more or less elevated behind the humeri. **liratus.**

Mannerheim's *fulvipennis, cinnamopterus* and *curtulus* are quite certainly members of this genus. The two first named are possibly identical and may be (as has been assumed) the same as *costicollis* Lec. I have seen nothing that appears to fit the description of *curtulus;* its reference to *Lathridius* is less certain than is that of the other two.

L. productus Rosenh.—At once distinguishable from every other known species of our fauna by the series of rather long, erect hairs upon each elytral interval. As compared with *liratus,* the size is smaller, the tempora longer than half the diameter of the eye; the thorax scarcely longer than wide, the front angles more strongly lobate, with a second marginal lobe a little behind the angles; the humeral interval costate to beyond the middle. Length 1.7–1.8 mm.

Hab.—Belon gives among his localities "Amerique Septentrionale." I have seen no native specimens.

L. lardarius De Geer.—This common European species has been reported from our fauna only from the Queen Charlotte Islands. It may be recognized by the large size—2.3 mm. or more—and by the elytra being subacuminately produced beyond the tip of the abdomen, their apices narrowly rounded. The punctures of the elytral series are less coarse than in *liratus,* and are much finer apically. The third interval is a little prominent toward the base, the seventh not at all elevated. In the male all the tibiæ are curved, minutely acutely dentate within near the apex, and finely serrate along the internal margin in about the apical half, these characters being most pronounced on the front tibiæ. (Pl. III, fig. 10).

L. breviclavus sp. nov.—Robust, reddish brown, the prothorax darker. Antennæ shorter than in *liratus,* the outer joints of the funicle less elongate, the ninth about as wide as long; club 2-jointed. Prothorax nearly as wide as long, not much narrowed at middle, the surface densely rugosely punctate, the costæ less sharply defined than in *liratus.* Elytra broadly oval, the strial punctures less coarse, especially toward the apex, than in *liratus;* the seventh interval distinctly carinate from the humerus to a little beyond the middle. (Pl. III, figs. 11 and 11*a*).

Hab.—Michigan (Grand Ledge); Long Island.

Two examples only are at hand, in which there are no apparent sexual characters. Among the species at present known in our fauna, this is at once recognized by its 2-jointed antennal club.

L. armatulus sp. nov.—Very closely allied to *liratus*, from which it may be separated with certainty by the longer tempora and the sexual characters. Aside from these there are certain other differences which become evident on comparison. The antennæ here are distinctly more slender than in *liratus*, the prothorax is, as a rule, much less narrowed at the middle—though this is a variable character in both species—the punctuation of the pronotum is denser, and the discal costæ less sharply defined. (Pl. III, figs. 12, 12*a*, 12*b* and 12*c*). Length 1.9–2.25 mm.

Hab.—California (San Francisco; Santa Barbara; Pomona; Catalina Id.).

This is a common species in maritime Southern California, occurring on various trees and plants. The tooth near the apex of the middle tibia in the ♂ is very minute and easily overlooked. In So. Cal. specimens, which may be considered typical, the humeral interval is not at all costate, being a little more convex and prominent at base. In some San Francisco examples possessing the same male characters and the long tempora, and therefore held to be identical, the humeral interval is more or less costate or subcostate toward the base, approaching in this respect *costicollis*.

I must admit that notwithstanding the apparently good characters used to separate them, I do not feel sure of the distinctness of *armatulus* and *costicollis*. Twenty-two examples of the latter have been seen, and in these no external sexual marks are present. It is barely possible of course that these are all females, and that the length of the tempora is not to be depended upon. If they are distinct, as I believe it best for the present to assume, then it is certain that they were confused by LeConte, and it matters little to which the name *costicollis* is applied.

L. montanus sp. nov.—Differs from *armatulus*—its nearest ally—in little, except the sexual characters mentioned in the table. The form is a little more elongate, and the prothorax is less narrowed at the middle than in any specimens of *armatulus* that I have examined. Length 2.2 mm.

Hab.—Colorado (Leavenworth Valley—10,000 ft.).

A single ♂ collected by Mr. Wickham.

L. costicollis Lec.—Nearly identical with *liratus* in every particular, except that mentioned in the table, viz.: the carination of the seventh interval of the elytra. This is a little variable in degree, but is too obvious to be mistaken in any one of the twenty-two specimens before me. No sexual characters are discoverable in the material at hand.

Hab.—Montana (Bear Paw Mt.); Colorado (Veta Pass); Utah (Park City, Alta); British Columbia (North Bend); Washington (Tenino); Oregon (Astoria); California (San Francisco).

The greater part of the specimens seen were collected by Hubbard and Schwarz.

This species has been suppressed as the equivalent of *fulvipennis* Mann.; while this course may be correct, the synonymy does not seem to me to be sufficiently well established.

L. liratus Lec.—Castaneous, legs and antennæ a little paler, glabrous, shining throughout. Head coarsely and densely punctate, longitudinally sulcate, the sulcus broader and deeper posteriorly; tempora parallel, usually nearly half as long as the eye, their hind angles right and scarcely rounded; antennæ nearly or quite attaining the hind angles of the pronotum, rather slender, joints all longer than wide, except the tenth, which is as wide as, or a little wider than long. Prothorax a little wider than the head, a little longer than wide, sides sinuately and moderately to rather strongly convergent from the lobed anterior angles to beyond the middle, thence slightly diverging to base; surface rather coarsely and somewhat irregularly punctate; margin reflexed, disk with two entire longitudinal costæ, which are nearly parallel in basal two-thirds, then arcuately divergent and showing a tendency to curve inward and unite along the anterior margin. The transverse subbasal impression is distinct and divided by the costæ into three broad depressions. Elytra broadly ovate, the side margin explanate, tips separately rounded and scarcely produced; disk broadly impressed behind the base, striæ coarsely punctate, the punctures distinct to the apex, though gradually smaller posteriorly; intervals a little convex, the third a little prominent at base, and the seventh more noticeably elevated—though not carinate—in basal half. Under surface subimpunctate and shining throughout; the metasternum with short, more or less distinct rugæ radiating from deep post-coxal foveæ; ventral segments very finely reticulate, except along their apical margins. (Pl. III, fig. 13). Length 2 mm.

Hab.—New Hampshire; Vermont; Rhode Island; Massachusetts; New York; Canada; Pennsylvania; West Virginia; Illinois; Michigan; District of Columbia.

A common species throughout the Northwestern United States and Canada. There are no external sexual characters.

CONINOMUS Thom.

This genus is closely allied to *Lathridius*, and though accepted by LeConte and Reitter, is more recently given only subgeneric standing by Belon. The prosternal process, however, here reaches the hind margin of the prothorax, completely separating the epimera, and according to the value we have chosen to ascribe to that character (I am not at all sure that its importance has not been overestimated), the two genera must be held as distinct. The very deeply incised prothorax gives to the members of *Coninomus* a facies which is not closely approached by any species of *Lathridius* known to me,*

* According to Belon *Lathridius alternatus* has the thorax nearly as deeply incised.

and the semi-transparent membranous border, which is here tolerably persistent, is only rarely represented in a modified form in *Lathridius*. To this we may add that the first two tarsal joints are nearly equal in *Coninomus*, and the antennæ are much shorter.

Those characters upon which so much reliance was formally placed, viz.:—the 2-jointed antennal club and longer tempora, are now seen to be of no value; in fact, as the somewhat numerous exotic species of *Coninomus* have become known, it is found that the greater number have a 3-jointed club, while in *Lathridius armatulus* the tempora are distinctly longer than in *Coninomus australicus*.

From *Enicmus*, *Coninomus* is always separable by the discal costæ of the pronotum, as well as by the incised margin and membranous border.

Our three species separate very simply.

Elytra not tuberculate.
Antennal club 2-jointed, tempora subequal in length to the eyes. **constrictus.**
Antennal club 3-jointed, tempora about half the length of the eyes. **australicus.**
Elytra tuberculate ..... **nodifer.**

Strangulatus Mann. is unknown, and the description is too short to do more than indicate its generic position. It is, without much doubt, only another synonym of *constrictus*, and if so, is the fifth one made by the same author.

C. constrictus Gyll.—Moderately elongate, feebly convex, glabrous, color varying from testaceous to piceous, the legs and antennæ paler in the darker specimens. Head rather longer than wide, rugosely punctate; front canaliculate, the channel broader behind; eyes prominent, tempora subequal in length to the eyes, and usually distinctly though slightly convergent. Antennæ short and compact, scarcely reaching the middle of the prothorax; club 2-jointed; joints 7–9 about as wide as long. Prothorax nearly as wide as long, sides a little rounded and subparallel to behind the middle, where they are deeply incised; margined from apex to base with a semi-transparent whitish membrane, which is quite persistent but seldom perfect, except in fresh specimens; disk punctate and longitudinally bicarinate, the posterior transverse impression moderately deep; there is usually plainly visible a short carina on each side at about the middle, nearly parallel with the discal costæ, and about midway between them and the side margin. Elytra elongate-oval, about twice as wide as the prothorax, moderately coarsely punctate-striate; intervals 3–5–7 distinctly but not strongly costiform. Metasternum with a few punctures anteriorly, and with distinct post-coxal foveæ, from which radiate rather short elevated rugæ. Abdomen impunctate. (Pl. III, fig. 15). Length 1.25–1.75 mm.

Hab.—This cosmopolitan species is rather common and widely

dispersed in our territory. I have seen specimens from Massachusetts, Virginia, South Carolina, Michigan, Illinois, Arizona, Oregon and California.

According to Belon the males have the frontal tibiæ curved, but in the twenty-five examples at hand I do not detect any difference that seems worthy of mention.

C. australicus Belon.—Very similar to *constrictus* in form, color and sculpture, but a little larger and differing constantly in the following respects: The antennal club is 3-jointed; the outer joints of the funicle are all distinctly elongate; the tempora are scarcely more than half the length of the eyes; and the elytral costæ are more strongly elevated. (Pl. III, figs. 14 and 14*a*). Length 1.65–2 mm.

Hab.—California (Alameda; Sylvania; Los Gatos; Pomona).

For the identification of this species I am indebted to Mr. Belon, who has carefully compared a Californian specimen with his Australian types, and finds no appreciable difference. It is not uncommon in California.

C. nodifer Westw.—Moderately elongate, varying in color from testaceous to piceous, glabrous, shining. Head, prothorax and under surface sculptured much as in *constrictus*; eyes small, tempora as long as, or a little longer, than the eyes and evidently convergent; antennæ slender, the eighth joint nearly twice as long as wide, the club 3-jointed. Elytra elongate-oval, intervals 3 5–7 costate, the third undulate by reason of a subbasal and median discal impression, and elevated into a prominent tubercle at about the apical third; fifth interval more strongly and acutely costate, most prominent near the apex; seventh undulate. Length 1.8–2.1 mm.

Hab.—Washington (Tenino); Oregon (Hood River, Astoria); California (Alameda, Los Gatos); Virginia (Ft. Monroe).

This species, unlike *constrictus* and *australicus*, exhibits well defined and unique secondary male characters. The hind tibiæ in this sex are rather strongly widened toward the apex and abruptly angularly emarginate on the inner side immediately before the tip; there are also at the posterior margin of the metasternum two prominent, conical, subacute tubercles, which are directed obliquely backward. I have seen no mention of this latter character by European authors.

ENICMUS Thom.

This genus was established by Thomson for those species of *Lathridius*, which, with normally large eyes, lack the discal costæ of the pronotum. The later European authors, while recognizing

the genus, have added no other distinguishing characters, and it apparently did not find favor with LeConte, who at least did not accept the name in a generic sense.

The mere presence or absence of pronotal costæ carries in itself very little weight, and without concurrent features of structure or facies can be considered no more than a convenient means of subdivision. Moreover, a careful comparison will show that there is no great difference in this respect between certain species of *Lathridius* in which the costæ are more feebly developed and tend to become obsolete anteriorly, and others of *Enicmus*, in which the margins of the median sulcus become distinctly carinate or subcarinate posteriorly where they cross the transverse impression. As we have already seen, however, the prosternal characters of *Lathridius* are precisely those upon which LeConte founded *Stephostethus* and distinguish it sharply from *Enicmus*, in which the prosternal process reaches the hind margin, completely separating the epimera.

Another character of some importance is seen in the relative lengths of the first and second tarsal joints. In *Lathridius* the second joint is distinctly longer than the first, while in *Enicmus* the two joints are of equal or very nearly equal length. As a rule, the prosternum is longer in front of the coxæ in *Enicmus*, the prothorax is transverse and widened rather than narrowed toward the middle, the antennæ are shorter, and the lower surface more strongly sculptured. These latter differences, however, become weakened or quite disappear in one species or another, so that they are characteristic only in a general sense.

Our species, like the European, are sharply divisable into two subgenera as follows:

Prosternal process not elevated into a crest, the coxæ more prominent.
Subgen. **Conithassa.**

Prosternal process elevated into a crest, which surpasses the summits of the coxæ.
Subgen. **Enicmus.**

The twenty-two species known to me are as follows:

Subgenus **CONITHASSA** Thom.

Tibiæ straight or nearly so in both sexes.....1.

Tibiæ rather strongly arcuate in the male.

Form elongate; prothorax as long as wide or nearly so, front angles lobed and moderately prominent; elytra a little produced at the apex.

More elongate, elytra nearly twice as long as wide, intervals not at all costate.
protensicollis.

Less elongate, elytra $1\frac{3}{4}$ times as long as wide, third interval a little convex, fifth and following intervals distinctly convex, the fifth and seventh more conspicuously so.....**suspectus.**

Form less elongate; thorax transverse, its front angles not lobed; elytra obtusely rounded at the apex, intervals 3–5–7 strongly costate.
desertus.

1. Elytral intervals each with a series of moderately long, stiff, erect hairs.
hirtus.

Body entirely glabrous.....2.

2. Prothorax broad, widest near the middle, sides rather strongly rounded.....7.

Prothorax narrower, widest near the front angles (except *crenatus*); elytra not carinate, or with at most the seventh interval acutely elevated.....3.

3. Metasternum and first ventral segment impunctate or virtually so.....6.

Metasternum and first ventral segment distinctly punctate or marked with longitudinal rugæ, or both.....4.

4. Punctures of elytral series very coarse, rounded, everywhere wider than the intervals.....5.

Punctures of elytral series less coarse, the intervals distinctly wider than the punctures, at least toward the suture; size larger.

Prothorax slightly transverse, the anterior angles lobed, sides parallel behind the angles; black, legs and antennæ more or less brownish.
nigritus.

Prothorax more strongly transverse, front angles not lobed, sides feebly convergent posteriorly; elytral intervals nearly equal and slightly convex; color usually black, legs and antennæ brownish..**cousimilis.**

Prothorax larger, transverse, front angles lobed, sides distinctly convergent posteriorly; elytral intervals alternately a little more convex, at least toward the sides; color usually brown, but occasionally blackish or entirely testaceous.....**minutus.**

5. Size small (1.25 mm.), elytral intervals nearly flat on the disk, a little convex toward the margins.....**crenatus.**

6. Rufotestaceous; prothorax not distinctly wider than the head, its sides nearly straight and subparallel; seventh interval of the elytra acutely carinate from base to apex.....**læviventris.**

7. Intervals 3–5–7 of the elytra acutely carinate.....**strenuus.**

Subgenus **ENICMUS** Thom.

Antennal club abruptly formed, the ninth joint transverse, nearly or quite twice as wide as the eighth, and but little narrower than the eleventh....1.

Antennal club much more gradually formed, the ninth joint elongate-obconic, scarcely wider at the base than the eighth, and usually decidedly narrower than the eleventh.....2.

1. Metasternum and first ventral segment punctate, the former without postcoxal foveæ.

Black, varying to ferruginous; surface opaque (except in var. *nitens*); series of elytral punctures equidistant.....**aterrimus.**

Black, opaque; elytral series approximated by pairs.....**duplicatus.**

Elytra testaceous, with black markings.....**maculatus.**

Metasternum and first ventral segment nearly or quite impunctate, but marked with numerous longitudinal rugæ, which are parallel on the first ventral, but on the metasternum radiate from moderately deep post-coxal foveæ.

Punctures of elytral striæ coarse, as wide as or slightly wider than the interspaces; a little finer, but deep and distinct to apex. **crassipunctatus.**

Punctures of elytral striæ much finer, narrower than the interspaces, becoming subobsolete at apex ..... **fictus.**

2. Tempora nearly as long as the eyes, slightly divergent..... **mimus.**

Tempora less than half the length of the eyes, subparallel or convergent posteriorly ..... 3.

3. Metasternum finely but distinctly punctate, without, or with but faint traces of longitudinal rugæ near the coxæ.

First ventral segment finely punctate; post-coxal foveæ of metasternum feebly developed; elytra impressed behind the base.

Elytra more elongate-oval, color blackish brown, legs and antennæ rufous; antennæ reaching the hind angles of the prothorax..... **vanus.**

Elytra more broadly oval, color ferruginous brown, legs and antennæ nearly concolorous; antennæ distinctly shorter..... **mendax.**

First ventral segment not evidently punctate, and bearing (in the ♂ at least) two minute bristle-like spines near the middle of the posterior margin; post-coxal foveæ of metasternum deep; elytra not impressed behind the base..... **ventralis.**

Metasternum with the sides more or less longitudinally rugose.

Punctures of elytral series much narrower than the interspaces, which are flat or nearly so; antennæ shorter, reaching but little beyond the middle of the prothorax.

Elytra more broadly oval, scarcely visibly impressed behind the base, the punctures coarser; margins of both prothorax and elytra a little broader and more reflexed; head entirely devoid of longitudinal sulcus ..... **cordatus.**

Elytra less broadly oval, distinctly impressed behind the base, punctures finer; margins of prothorax and elytra somewhat less broadly reflexed; head with distinct, median, longitudinal sulcus. **tenuicornis.**

Punctures of elytral series much coarser, nearly as wide toward the base as the interspaces, which are there decidedly convex; antennæ reaching the hind angles of the prothorax..... **sulcatulus.**

E. protensicollis Mann.—Elongate, subparallel, feebly convex, color varying from testaceous to brown, the thorax usually a shade darker than the elytra, the latter often with an elongate sutural strip darker, in the anterior half. Head about as long as wide, rugosely punctate and channeled; eyes moderate, prominent, tempora a little shorter than the eyes, visibly divergent; antennæ not quite reaching the hind angles of the pronotum, tenth joint about as wide as long; all others, except the first, distinctly elongate. Prothorax a little wider than the head, as long as wide or very nearly so, front angles lobed, sides nearly parallel behind the angles; surface closely rugosely punctate; median channel shallow, its sides feebly interrupting the subbasal transverse depression, which

is well defined throughout, but deeper at its extremities; an impression within the front angles, and usually a smaller fovea or depression on either side of the median sulcus at or just before the middle; margin not distinctly crenulate. Elytra about twice as wide as the prothorax, twice as long as wide or nearly so, sides feebly arcuate and subparallel to beyond the middle, thence acutely narrowed to apex; striæ feebly impressed on the disk, a little more noticeably at sides; punctures coarse, a little less wide than the intervals toward the suture, but scarcely so laterally; intervals nearly flat or slightly convex, the convexity increasing somewhat toward the margin. Metasternum distinctly punctate, and anteriorly with short rugæ radiating from deep post-coxal foveæ. First ventral segment rather sparsely and a little more finely punctate, and more or less longitudinally rugose; following segments remotely finely punctulate. Tibiæ all moderately strongly arcuate in the male, feebly so in the female. (Pl. III, fig. 16). Length 2.4–2.6 mm.

Hab.—Alaska, Ft. Wrangel (Wickham); Nushagak; Sitka; Aleutian Islands.

Typical specimens of Mannerheim's *quadricollis*, *sobrinus* and *protensicollis* are in the LeConte collection. These appear to be identical, and LeConte's course in uniting them under the last name is probably correct.

E. suspectus sp. nov.—Very closely allied to the preceding and differing very little, aside from the somewhat shorter elytra and the character of the elytral intervals as described in the table. The size is, however, distinctly smaller and the elytra a little less shining. It may possibly be only a geographical race of *protensicollis*, but as the differences mentioned are quite constant in the fairly good series of both which I have examined, I shall risk giving it a name. (Pl. III, fig. 17). Length 2–2.25 mm.

Hab.—Oregon (Hood River); California (Kern Co.; Panamint Mts.; Pomona).

E. desertus sp. nov.—Again allied to *protensicollis*, and still more closely to *suspectus*, but at once distinguished as follows: The prothorax is smaller, distinctly transverse, the front angles a little less conspicuously lobed, the median sulcus deeper, its sides more distinctly interrupting the tranverse subbasal impression. Elytra much less elongate than in *protensicollis*, and more obtusely rounded at tip than in either of the two preceding species. The third interval is moderately elevated in basal two-thirds, and the fifth and seventh are costate throughout; the other intervals are perfectly flat. The color varies from testaceous to piceous brown. (Pl. III, fig. 18). Length 2–2.2 mm.

Hab.—Arizona (Tacna; "Catal. Mts."; Yuma); California (Palm Springs). Hubbard and Schwarz collection. There are examples in the Horn collection from both Arizona and California, but without specific locality.

E. hirtus Gyll.—Black, legs and antennæ brown. Prothorax one-half as wide as the elytra, nearly square, with moderate, long, recumbent or subrecumbent hairs, which are condensed along the side margins, and in narrow longitu-

dinal lines bordering the median sulcus. Elytra with a single line of rather coarse erect hairs on each interval. Metasternum quite coarsely punctate and with radiating rugæ. Abdomen finely, sparsely punctate. Length 1.6-2.2 mm.

Hab.—New Hampshire (North Conway); New York; Montana.

I have seen six examples of this species labelled as occurring in our territory: one from the first named locality submitted by Mr. Blanchard, four in the LeConte cabinet from New York, and one from Montana in the Hubbard and Schwarz collection. It is not rare in the colder parts of Europe.

E. nigritus sp. nov.—Moderately elongate, feebly convex, black, legs and antennæ more or less brownish. Head coarsely, rugosely punctate, median sulcus distinct, broader behind; eyes prominent, temples more than half as long as the eyes, nearly parallel; antennæ as in the preceding species. Prothorax nearly square, but slightly wider than the head, except at the front angles, which are distinctly though not strongly lobed; impressions as in *gelasinellus*, the median sulcus rather deeper, its edges distinctly interrupting the posterior transverse impression in the form of two short carinæ. Elytra elongate-oval, coarsely punctate-striate, the punctures subquadrate and a little elongate, a little less coarse apically; the intervals of about equal width and scarcely wider than the punctures, feebly convex near the suture, more distinctly so toward the sides, but not distinctly alternating in convexity; each with a series of excessively fine punctures, which are scarcely visible in some examples, but more evident in others. Metasternum moderately coarsely, closely punctate, the punctures mixed anteriorly with short rugæ radiating from the post-coxal foveæ. First ventral more sparsely and less coarsely punctate than the metasternum, and with rather fine, longitudinal rugæ behind the coxæ. Length 1.65-2 mm.

Hab.—Washington (Tenino); California (Los Gatos). Hubbard and Schwarz collection.

There is a specimen from Placer Co., Cal., before me which probably belongs here, but it is considerably larger (2.3 mm.), the third, fifth and seventh intervals of the elytra are more convex, and the second interval is decidedly wider than the striæ. *Nigritus* is most closely related to *consimilis*, from which the less transverse prothorax, with the front angles distinctly lobed, must be depended upon to separate it.

E. consimilis Mann.—Very closely resembling the preceding, and differing only by the more transverse prothorax, with the anterior angles scarcely at all lobed, the slightly wider and less convex elytral intervals, and the somewhat less coarsely punctate metasternum, with much less developed rugæ, the latter being very short and inconspicuous in the specimens I have been able to examine. Pl. III, fig. 19. Length 2-2.2 mm.

Hab.—Michigan (Agricultural College).

This species is somewhat widely diffused, but not very common in

Europe, and is also known from Siberia. Very few American specimens have been seen by me, and these from the above mentioned locality only. It is possible that they are only chance importations. Mannerheim's *parallelicollis* has been declared to be a synonym of *consimilus* by European authorities. It was described from Finland if I mistake not, and has found a place on our list on the supposition that it occurs in Alaska. I am disposed to doubt the accuracy of the reference, and I note that Belon does not include it in his recent catalogue.

E. minutus Linn.—This extremely common cosmopolitan species is so well known as to need little comment. It is quite closely related to the two proceding species, and the characters in the table will probably suffice for its recognition. The great majority of specimens, as seen in this country at least, are brown, while both *nigritus* and *consimilus* are black or piceous black—so far as observed. In *minutus* the prothorax is larger than in either of the others, and the sides are distinctly convergent from the front angles to the base, while more nearly parallel in *consimilus*, and almost perfectly so in *nigritus*. The elytral intervals are a little narrower than in *consimilis*, and are distinctly alternating in convexity. (Pl. III, fig. 20). Length 1.2–2.2 mm.

Hab.—New Hampshire; Massachusetts; New York; Pennsylvania; Maryland; District of Columbia; Michigan; Wisconsin; Illinois; Missouri; Texas; Wyoming; Colorado; Washington; Oregon; California; Alaska.

The above localities (except Alaska) are represented in the material at hand, but it probably occurs in every part of our territory.

E. crenatus Lec.—Moderately elongate, brown or piceous, rarely testaceous, legs and antennæ rufotestaceous. Head rugosely punctate, median sulcus indistinct; eyes moderate; tempora parallel, about one-half the length of the eyes; antennæ reaching the middle of the prothorax, compactly formed. Prothorax subquadrate, widest at or a little before the middle, the sides anteriorly a little arcuate, posteriorly slightly concave and a little convergent; surface rugosely punctate, except along the basal margin, which is quite smooth; median sulcus vague; subbasal impression moderately deep, not interrupted at middle. Elytra elongate-oval, very coarsely punctate-striate, the intervals usually narrower than the punctures throughout. Metasternum subimpunctate, marked with rather coarse, moderately long rugæ radiating from arcuate post-coxal fossæ. First ventral with distinct longitudinal rugæ, the second with traces of similar sculpture. (Pl. IV, fig. 21). Length 1.2—1.4 mm.

Hab.—California (San José; Pomona; Palm Springs; San Diego); Utah (Provo; Mill Creek; Utah Lake); Texas.

The smallest species of the genus, and very easily recognized by the very coarse punctures and narrow intervals of the elytra. The prothorax lacks almost entirely all impressions, except the basal and

the median longitudidal sulcus; the latter of which is very feeble, its sides scarcely interrupting the basal depression. The metasternal fossæ are obliquely arcuate instead of foveiform as elsewhere.

E. lævicentris sp. nov.—Broadly oval, moderately convex, rufotestaceous. Head transverse, rugosely punctate, median sulcus represented by a somewhat vague posterior depression; eyes very prominent, tempora very short; antennæ passing the middle of the prothorax, the tenth joint a little transverse, all the others longer than wide; the club not very abruptly formed. Prothorax very slightly wider than the head, subquadrate, slightly wider than long, sides nearly straight, just visibly rounded before the middle and faintly sinuate posteriorly; surface rather finely and scarcely rugosely punctate, disk convex anteriorly, without median sulcus; a median fovea each side at about the middle, which is confluent posteriorly with the transverse basal impression. Elytra broadly ovate, twice as wide as the prothorax, coarsely punctate-striate; intervals scarcely wider than the striæ, the third distinctly more convex from base to middle, the seventh acutely carinate throughout. There is a small but distinct subbasal impression involving chiefly the third and fourth striæ. Under surface almost devoid of sculpture, the usual post-coxal foveæ of the metasternum obsolete. Length 1.4 mm.

Hab.—Oregon (Astoria). A single example in the Hubbard and Schwarz collection.

In the unique type the middle and hind tibiæ are armed within at the apex with a slender acute spine, which projects nearly in line with the axis of the tibiæ. That of the middle tibia is smaller, and the front tibia is either unarmed, or so feebly so that the spine is not distinct. It is probably a male character.

E. strenuus sp. nov.—Moderately robust, dark brown, legs and antennæ rufous. Head densely rugosely punctate, median sulcus represented by a posterior depression; eyes moderate, tempora about one-half as long as the eyes; antennæ passing the middle of the prothorax, the tenth joint fully as long as wide, the eighth one-half longer than wide. Prothorax distinctly transverse, widest very slightly in advance of the middle, the sides a little convergent but nearly straight in front, faintly concave behind; surface coarsely rugosely punctured, the transverse depression deeper at sides as usual, the median sulcus consisting of a larger anterior and smaller posterior impression, the latter bounded by two feebly elevated ridges, which interrupt the basal depression; side margins flattened and slightly reflexed. Elytra oblong-oval, sides broadly arcuate and subparallel; coarsely punctate-striate, intervals 3-5-7 acutely costate. Meso- and metasternum and first ventral segment not punctate, but marked with longitudinal rugæ; those of the mesosternum fine and rather distinct; of the metasternum longer and coarser, radiating from the post-coxal foveæ; and those of the first ventral very coarse, parallel, extending the whole length of the segment throughout its width. (Pl. IV, fig. 22). Length 1.8 mm.

Hab.—Colorado (Ouray, 7500–8000 ft.).

Described from a single example of undetermined sex, taken by

Mr. Wickham, who very kindly allows the type to remain in my collection. The thorax is broader than in any other *Conithassa*, and departs from the usual form in being widest near the middle. In no other species known to me are the rugæ of the first ventral so strongly developed.

E. aterrimus Mots.—Elongate, depressed, opaque, blackish, varying to ferruginous. Head densely but not coarsely punctate, longitudinally sulcate; tempora parallel, about one-fourth the length of the eyes; antennæ short, scarcely attaining the middle of the pronotum; club abruptly formed, compact, joints nine and ten a little transverse, several of the preceding joints about as wide as long. Prothorax transversely cordate, a little sinuate before the hind angles, which are slightly obtuse; surface densely punctate, disk with a median somewhat shallow impression anteriorly, and a deeper transverse antebasal depression; side margins finely serrulate. Elytra one-half wider than the prothorax, subparallel, punctate-striate, the punctures closely placed and subrectangular, only slightly finer apically, except in the two interior striæ; intervals nearly flat on the disk, a little convex near the margin, disk obliquely impressed each side near the base. Sterna and first ventral densely punctate, remaining ventral segments sparsely, finely punctulate. The punctures of the metasternum are a little coarser than those of the first ventral, and nearly equally coarse and evenly distributed throughout. (Pl. IV, figs. 23, 23*a*), Length 1.6–1.9 mm.

Hab.—Massachusetts; New York; District of Columbia; Maryland; West Virginia; Michigan; Canada; Illinois; Southern California.

This widely dispersed species is so exceedingly like the common European *brevicornis* that I have been greatly tempted to unite them. In his description of *E. ferrugineus* from a North American specimen sent by Wickham, Belon notes that the metasternum is uniformly punctate throughout, while it is decidedly more sparsely and finely punctate at the middle than at the sides in *brevicornis*. Belon mentions one or two other slight differences, which are, however, of no moment. Now *ferrugineus* is only the pale form of the species described in 1866 by Motschulsky as *aterrimus*, and in 1878 by LeConte as *opaculus;* and since the deviation from European specimens in the matter of metasternal punctuation seems tolerably constant in all American specimens examined, our species is for the present held to be distinct under the name used above.

Var. *nitens*.—This name is proposed for a slightly smaller and more slender form, with both upper and under surface distinctly shining. It is, perhaps, distinct, but there seems to be no other characters to support such a view. A small series from Marquette, Mich., in the Hubbard and Schwarz collection is all that I have seen.

This form in common with typical *aterrimus* and *brevicornis* possesses a character which appears to have escaped notice by previous writers. The first joint of all the tarsi bears beneath, at the apex, a short acute spiniform process, which varies a little in development. This variation may possibly be dependent on the sex of the individual, though I have not been able to assume myself that this is the case. The middle coxæ are rather more widely separated than in any other of our species.

E. duplicatus Lec.—"Moderately elongate, blackish piceous, opaque. Prothorax one-half wider than long, narrowed behind, sides finely serrate, rounded in front, oblique behind, hind angles obtuse; disk feebly impressed in front of middle, and with a shallow transverse impression behind the middle. Elytra one-third wider than the prothorax, elongate-oval, striæ composed of punctures, not regularly arranged, and approximated by pairs; the sutural and two outer ones are slightly impressed near the tip. Legs rufopiceous." Length 1.9 mm.

Hab.—Illinois; Michigan (Detroit).

The above is LeConte's description. I have seen only the two type specimens in the LeConte cabinet. It is separable from all others by the approximation of the elytral striæ by pairs.

E. maculatus Lec.—Less elongate than *aterrimus*, the elytra more oval; black, opaque, elytra testaceous, irregularly maculate with black. Head and thorax densely, finely punctate, the former strongly channeled, the latter transversely cordate, posteriorly deeply transversely impressed and with a deep longitudinal discal fovea anteriorly. Elytra elongate-oval, finely striate, the striæ finely punctate. Metasternum finely, moderately closely punctate lateraliy, less closely at the middle; first ventral segment still more finely punctate, the following segments indistinctly punctulate. Length 1.9–2.1 mm.

Hab.—Virginia; Ohio; Michigan.

The short description above is quite sufficient for this species, which is, by coloration, the most easily recognized Lathridiid in our fauna. It does not appear to be at all common, and I have seen altogether not more than a dozen examples.

E. crassipunctatus sp. nov.—Elongate-oval, feebly convex, subopaque, fuscous, the elytra with the humeri and a broad apical area ferruginous, legs and antennæ ferruginous. Head scarcely at all wider than long, densely rugosely punctate; front convex, longitudinally lightly sulcate; eyes small, tempora parallel and nearly as long as the eyes; antennæ passing slightly the middle of the prothorax, outer joints of funicle subquadrate, club abruptly formed, its first two joints transverse. Prothorax transversely subquadrate, widest just in front of the middle, sides not strongly rounded, a little sinuate posteriorly, base and apex subequal, surface densely punctate, foveate anteriorly on the disk, and moderately, deeply, transversely impressed before the

base; side margin slightly explanate and a little reflexed, minutely indistinctly crenulate. Elytra elongate-oval, with striæ of very coarse punctures, which are as wide as, or even a little wider than the intervals, and with the exception of the two inner striæ, but little finer apically; intervals nearly flat on the disk, the two outer ones distinctly convex. Body beneath impunctate, the metasternum with numerous elevated lines or rugæ radiating from post-coxal foveæ; first ventral segment with many similar subparallel longitudinal rugæ. Middle coxæ separated by substantially their own width. Length 1.4 mm.

Hab.—Arizona.

Described from two examples taken by Mr. Schwarz in the Chiricahua Mts. in the extreme southeastern part of the Territory.

E. fictus sp. nov.—Elongate-oval, feebly convex; head and prothorax blackish, subopaque; elytra castaneous or piceo-castaneous, feebly shining; beneath piceous brown, legs and antennæ rufous. Head about as long as wide, densely rugosely punctate, with a well-defined median sulcus, and on each side a shorter feebler one; eyes small, prominent, tempora parallel and nearly as long as the eye; antennæ a little longer than in *aterrimus* but similarly formed. Prothorax transversely subquadrate, sides feebly rounded, a little convergent posteriorly, not sinuate before the hind angles, margin minutely indistinctly crenulate; median sulcus shallow, a little broader anteriorly, the basal transverse impression deep. Elytra elongate-oval, striæ scarcely impressed, except the sutural and two lateral ones, which are noticeably deeper; the punctures moderate at base, growing finer posteriorly, and nearly obsolete well before the apex. Beneath impunctate, metasternum with short and rather fine rugæ radiating from the post-coxal foveæ, but not reaching the hind margin; first ventral segment with very fine, subparallel, longitudinal rugæ in basal half. Middle coxæ separated by distinctly more than their own width. (Pl. IV, fig. 24). Length 1.65-1.85 mm.

Hab.—Montana (Bear Paw Mt.); Colorado (Garland and Veta Pass); "Fort McLeod, N. W. Territory;" Nevada; California

This species resembles *mimus* very closely, but the latter differs by the antennal joints being a little more elongate and the club less abruptly formed, and more conspicuously by the metasternum and first ventral segment being distinctly punctate over the entire surface. In these respects *fictus* agrees with *crassipunctatus*, from which the characters of the table, together with its larger size and different coloration, at once separate it.

E. mimus sp. nov.—The preceding description will serve admirably for this species with the following modifications and additions: The tempora are just perceptibly divergent, the prothorax more evenly rounded at the sides and widest very near the middle; the elytra a trifle more elongate, with the striæ a little more coarsely punctate; the metasternum finely and rather sparsely punctate laterally, and still more sparsely and finely at the middle, with only faint indications of rugæ close to the post-coxal foveæ; first ventral finely and sparsely but distinctly punctate, not rugose; color nearly uniform throughout, but varying from rufotestaceous to piceous. Length 2 mm.

Hab.—Colorado. One example from Denver and others without locality; Idaho, Beaver Cañon.

Very similar to *fictus*, but differing distinctly in the sculpture of the under surface and in antennal formation, as described under the last named species. The resemblance to the European *transversus* is also very marked, a specimen in the Hubbard and Schwarz collection indeed bearing this label. In *transversus* the prothorax is ordinarily darker in color than the elytra, the sides are straighter, the elytra a little more parallel and more obtusely rounded at the apex, the metasternum and first ventral not punctate, but marked with rugæ as in *fictus*, the first ventral with an impressed line produced obliquely backward for a short distance behind the inner margin of the coxæ. This impressed line is also present in the European *rugosus*, but I have not detected it in any of our species. The antennæ in *transversus* are formed as is *mimus*.

E. vanus sp. nov.—Elongate-oval, moderately convex, piceous, feebly shining, legs and antennæ rufous. Head as long as wide, rugosely punctate, convex, without median sulcus, a small impression at the middle of the posterior margin; eyes moderate, prominent, tempora a little more than one-third the length of the eyes; antennæ rather slender and reaching the hind angles of the prothorax, all joints after the first much longer than wide, except the tenth which is but slightly so. Prothorax transverse, widest before the middle, sides moderately rounded anteriorly, faintly sinuate before the hind angles, which are nearly right; margins faintly subserrulate; surface rugosely punctate, a narrow, nearly complete but not deeply impressed median line, which is but slightly expanded anteriorly, and a deeper and broad transverse basal impression. Elytra elongate-oval, widest at the middle, finely punctate-striate, the punctures smaller and more lightly impressed toward the apex; interspaces nearly flat, the outer one very slightly convex; minutely subrugulose and dull. Metasternum rather sparsely, finely punctate, with a few very short and indistinct rugæ radiating from the posterior margins of the feeble post-coxal foveæ; median impressed line of metasternum nearly complete. First ventral finely and still more sparsely punctate, its surface minutely alutaceous anteriorly, its posterior margin moderately shining, as are the following segments. Length 1.9 mm.

Hab.—Colorado (Ouray, 7500–8000 ft.).

A single example was taken at the above locality by Mr. Wickham, who has very generously allowed me to retain it. It is closely allied to the following species, and also to the European *rugosus*, from the latter of which it may be distinguished by the absence of the oblique impressed lines of the first ventral, to which reference has already been made under *mimus*.

E. mendax sp. nov.—Very close to *vanus* and differing as follows: The color is invariably uniformly ferruginous brown throughout in the series of fifteen examples before me; the form is a little broader, the antennæ distinctly

shorter, never attaining the hind angles of the pronotum; the metasternum is moderately, closely punctate at the sides, but very much more finely and remotely at the middle, while in *vanus* there is not much disparity. (Pl. IV, fig. 25). Length 1.6–1.9 mm.

Hab.—Arizona (Chiricahua Mts.—Schwarz).

E. ventralis sp. nov.—Moderately, broadly ovate, convex, reddish brown throughout. Head transverse, rugosely punctate, median sulcus distinct, a little deeper and wider behind; eyes prominent; tempora about one-fourth the length of the eyes, subparallel; antennæ not quite reaching the hind angles of the pronotum, all joints longer than wide. Prothorax transversely quadrate, sides nearly straight and parallel, rounding in a little at the front angles; margin obsoletely, minutely serrulate; surface rugosely punctate, median sulcus shallow, broader in front, posterior transverse impression deep. Elytra rather broadly ovate, not impressed toward the base, striæ feebly impressed, punctures of moderate size at base, gradually finer posteriorly; intervals nearly flat on the disk, the seventh acutely carinate nearly throughout its length. Metasternum distinctly, moderately closely punctate at sides, more sparsely toward the middle; postcoxal foveæ deep, the radiating rugæ short and inconspicuous. Ventral segments impunctate; the first with two short, posteriorly inclined bristles or spines near the middle of the hind margin; the fifth truncate, the truncature feebly sinuate and with the side angles a little prominent. (Pl. IV, fig. 26). Length 1.65 mm.

Hab.—California (Los Gatos and Lake Tahoe).

Two examples in the Hubbard and Schwarz collection are all that I have seen of this interesting and very distinct species. There is little doubt that the ventral peculiarities above described are sexual. Nothing similar has been observed elsewhere, and they will render the species at once recognizable if males are at hand; if not, the sculpture of the under surface, the parallel sided thorax and carinate seventh interval of the elytra will serve quite as well.

E. cordatus Belon.—Broadly oval, convex, red-brown. Head densely rugosely punctate, without median sulcus; eyes rather small but prominent, tempora apparently about one-third the length of the eye; antennæ slightly passing the middle of the prothorax, the first joint subglobular as usual, all others longer than wide, except the tenth, which is about as wide as long. Prothorax three-fourths broader than the head, transversely cordate, moderately strongly rounded in front, scarcely sinuate before the hind angles, which are oblique; side margins rather broadly explanate and a little reflexed, minutely, indistinctly crenulate; surface coarsely, densely, rugosely punctate and opaque, disk convex, the median sulcus obsolete, basal depression broad, deeper at the sides. Elytra moderately shining, broadly ovate, convex, without subbasal impression; margin explanate; striæ a little impressed, the punctures rather strong toward the base, finer apically; intervals very slightly convex. Metasternum with deep postcoxal foveæ, and numerous longitudinal rugæ, especially toward the sides. First ventral impunctate and with a few very fine and indistinct rugæ. (Pl. IV, fig. 27). Length 1.7 mm.

Hab.—Oregon; British Columbia (North Bend—Schwarz).

Two examples only have been seen, that from the former locality being the type which Mr. Belon has most kindly sent me for examination. It is clearly distinct from *tenuicornis* though closely allied.

E. tenuicornis Lec.—Oval, feebly convex, brown, the apical two-thirds of the elytra often blackish, legs and antennæ rufous or rufotestaceous; head and thorax densely rugosely punctate and opaque, elytra moderately shining. Head with distinct median sulcus, eyes moderately large and prominent, tempora short; antennæ slightly passing the middle of the pronotum, proportional as in the preceding species. Prothorax transversely cordate, sides moderately rounded in front, a little sinuate before the hind angles, which are nearly right; median sulcus lightly impressed, the transverse basal impression as usual; side margins rather broad and slightly reflexed, minutely subcrenulate. Elytra rather broadly oval, strongly margined, impressed near the base, finely punctate-striate, the punctures a little coarser toward the base; intervals nearly flat. Metasternum not punctate, sides distinctly longitudinally rugose, the post-coxal foveæ large. First ventral with rather fine, longitudinal rugæ, which vary somewhat in development, and are usually most noticeable behind the coxæ. (Pl. IV, figs. 28, 28*a*). Length 1.6–1.9 mm.

Hab.—Pacific Coast from Vancouver to So. California; Nevada; Arizona (Chiricahua Mts.); Colorado (Ouray); Montana (Gallatin Co.); Michigan (Detroit); New York (Otsego Co.)

The Michigan example, with which the New York specimens are doubtless identical, though I have not made actual comparison, was described by LeConte as *laticollis*, but the small differences named do not appear to me to be specific. The few eastern specimens seen are uniformly brown, as is the type of *tenuicornis*, but the majority of the western specimens have the elytra blackish, except at base. In the males the tibiæ are all finely serrulate within in about the apical three-fourths, and are distinctly mucronate at tip. The same male characters are seen in the European *testaceus*, but appear to have been overlooked by the European authors, at least Belon does not refer to it in his monograph. The fact is noteworthy since external sexual marks are present in but few species of *Enicmus* proper. *Testaceus* and *tenuicornis* are very similar in nearly all respects, but our species may be distinguished by the absence of the oblique impressed lines of the first ventral, which seem to be always present in *testaceus*.

E. sulcatulus sp. nov.—Oval, subconvex, reddish brown, shining, the head and prothorax a little darker and duller because of their dense punctuation. Head without median sulcus; eyes moderately large, tempora short; antennæ attaining the hind angles of the pronotum, proportional about as usual. Prothorax broad, subcordate, widest at about the middle, base and apex subequal, the sides a little sinuate before the hind angles, which are only very slightly

obtuse; median sulcus faint, basal transverse impression strong, margins a little explanate, not distinctly serrulate. Elytra elongate-oval, striæ distinctly impressed, the punctures coarse toward the base, intervals distinctly convex toward the base, less so apically. Mesosternum longitudinally rugose, metasternum with long, rather coarse, subparallel rugæ, which reach nearly to the hind margin. Abdomen impunctate, the first segment without rugæ. All the tibiæ distinctly mucronate internally at the apex in the male, but the inner margin is not visibly serrulate. Length 1.75 mm.

Hab.—California. A single male without definite locality in the Horn collection.

CARTODERE Thom.

The small size, narrow or even linear often subdepressed form, the elytra with approximate rows of large rounded perforate punctures, give to the members of this genus a characteristic facies which can scarcely be mistaken. As heretofore constituted, the genus is in several points of structure quite polymorphic, and as represented with us the species are only fairly homogeneous, even after the removal of *watsoni* and *unicostata*, each of which I have made the type of a distinct genus. The reasons for so doing are given elsewhere, and are based on certain structural peculiarities which must have been entirely overlooked by the European authors, as they are too important to have been passed over in silence if observed. As here restricted the species of our fauna exhibit the following characters, in addition to those of general facies above mentioned: Head subtriangular or trapezoidal, usually distinctly longer than wide; antennæ shorter than the head and prothorax, inserted far in advance of the eyes, which are small or even minute, club (except in *filum* and *intermedia*) 3-jointed, abrupt. Prothorax without costæ, more or less deeply transversely impressed posteriorly (except *quadrifoveolata*). Scutellum indistinct, elytra each 6–8 punctate-striate. Surface beneath, at least of the metasternum and abdomen, impunctate (except *elegans*); side pieces of metasternum not visible, the sutures apparently obliterated; ventral segments five in both sexes, the sutures deep. Front and middle coxæ always distinctly separated, the former sometimes rather narrowly, the latter always more widely. Legs short and stout, first two tarsal joints short, subequal. In all our species except *ruficollis*, the elytral intervals bear sparse, fine, excessively short erect hairs, which are, in most cases, only visible when the elytra are viewed in profile. External sexual characters have been noticed only in *elegans* and *costulata*. In the former the front and middle tarsi are 2-jointed in the male; an

extraordinary character, which is again seen in *Adistemia watsoni*, the front tarsi alone, however, being here affected.

The study of this genus has proved of singular interest to me, and I much regret that our fauna contains so few of these odd little creatures, all of which, indeed, with the apparent exception of *quadrifoveolata*, have been introduced through commerce. Their separation is perfectly simple, as will appear below.

Under side of body, at least of metasternum and abdomen, virtually impunctate; labrum not inclosing epistoma at sides.
  Antennal club triarticulate.
    Prothorax much narrower than the elytra.
      Elytra each with six rows of punctures, the third and fifth intervals costate. ..... **quadrifoveolata.**
      Elytra each with seven rows of punctures, intervals not costate. **ruficollis.**
    Prothorax but slightly narrower than the elytra.
      Eyes minute, situated at about their own length from the hind angles of the head.
        Elytral intervals 3-5-7 costiform..... **costulata.**
        Elytral intervals subequal, not costiform, form narrower.. **filiformis.**
      Eyes much larger, occupying the hind angles; tempora wanting.. **argus.**
  Antennal club biarticulate.
    Pronotum without anterior discal fovea..... **intermedia.**
    Pronotum with a large, rounded, more or less deep anterior discal fovea. **filum.**
Underside of body, except the abdominal apex, coarsely, closely punctate; labrum inclosing the epistoma at sides..... **elegans.**

Cordicollis Mann. is unknown to us. It is more than likely that it is not different from *ruficollis*.

C. quadrifoveolata sp. nov.—Elongate, parallel, subdepressed, rufotestaceous. Head longer than wide, trapezoidal, the epistoma not dilated at sides; labrum prominent and rather deeply emarginate; eyes minute, composed of few lenses, and situated very near to the hind angles, which are nearly right; tempora subequal to the eyes; surface finely rather closely punctate, and with a foveiform impression each side at about the middle. Antennæ short and stout, not attaining the hind margin of the prothorax; basal two joints suborbicular, the first larger, joints 3–8 narrower than the second, subglobular, the outer ones a little transverse; club 3-jointed, somewhat gradually formed, the joints successively wider, ninth and tenth transverse, eleventh as long as wide. Prothorax but little wider than the head, as long as wide, sides feebly arcuate and a little convergent posteriorly, disk finely, not very closely punctate and four foveolate, the anterior foveæ larger and connected by a shallow transverse groove. Elytra nearly twice as wide as the prothorax, subparallel and about equally obtusely rounded before and behind; each with six rows of very large, deep punctures, the intervals narrow, the third and fifth wider and costate, the latter strongly so. All the intervals appear to bear short, fine, suberect hairs. Beneath subimpunctate, the prosternum with a few fine punctures in front; metasternum short,

depressed along its anterior and posterior margins; first ventral longer than the metasternum, distinctly and deeply bifoveate at the middle, and with less well defined impressions immediately behind the coxæ. Front and middle coxæ about equally, and rather narrowly separated. (Pl. IV, fig. 29). Length 1 mm.

Hab.—California (Los Gatos).

A single example in the Hubbard and Schwarz collection. The nondilated epistoma and elytra, each with six rows of punctures, at once distinguish this very interesting species, which is the most minute in our fauna. The eyes are as small as in *filiformis*.

C. ruficollis Marsh.—Moderately elongate, subconvex, color usually rufoferruginous, with the elytra brownish, but occasionally concolorous. Head subtrapezoidal, a little longer than wide, densely but not coarsely punctate, not impressed; eyes moderate, situated a little before the hind angles; antennæ rather short and stout, not reaching the hind margin of the pronotum, club somewhat abrubt, 3-jointed; first joint large, orbicular; second less thick, elongate-oval; third small and subglobular; fourth to eighth obconic, gradually shorter, but all longer than wide; joints of club of equal width, ninth longer than wide, tenth a little transverse, eleventh as long as the ninth. Prothorax subcordiform, often with membranous margins; without the margin slightly wider than the head, sides rather strongly rounded anteriorly, quite deeply incised or constricted posteriorly, transversely impressed between the points of constriction; disk otherwise without foveæ or costæ, surface densely, rather finely punctate, side margin not well defined. Elytra elongate-oval, each with seven rows of coarse, closely-placed punctures, which are sometimes a little confused on the disk; intervals narrow, crenulate by the punctures, plane or very feebly convex, except the sixth, which is slightly more prominent. Beneath impunctate, the metasternum with a transverse groove behind the coxæ, which is deeper at the extremities. Front and middle coxæ well separated; legs rather stout. (Pl. IV, fig. 30). Length 1–1.2 mm.

Hab.—Massachusetts (Blanchard); New York; Pennsylvania; Virginia; Oregon (Astoria—Hubbard and Schwarz).

A common species throughout Europe, and one that is likely to become quite cosmopolitan.

C. costulata Reitt.—Elongate, subconvex, rufotestaceous. Head distinctly longer than wide, sides moderately convergent from the eyes to the epistoma, which is a little dilated at sides; labrum distinctly emarginate; eyes small, situated at their own length from the basal angles, which are nearly right; surface finely subrugosely punctate, in some examples with a faint median longitudinal impression, which may be better defined, especially anteriorly, by very fine elevated lines. Antennæ shorter than the head and prothorax, joints 3–8 all evidently longer than wide, club rather abruptly 3-jointed, the ninth and eleventh longer than wide, the tenth as wide as long. Prothorax fully one-half wider than the head, distinctly transverse, sides rounded anteriorly, moderately convergent and nearly straight, or slightly sinuate from about the middle to the hind angles, which are slightly obtuse; side margin rather broadly explanate or subexplanate, disk not or but very faintly impressed at the middle anteriorly,

the posterior transverse groove deep; surface closely rugosely punctate on the convex portion of the disk, the side margin and transverse groove nearly smooth. Elytra about one-fourth or one-fifth wider than the prothorax, margin obtusely angulate at the humeri, and very broadly subangulate before the middle; each with eight rows of moderately coarse and deep punctures; intervals 3 5–7 distinctly but not strongly costate; a transverse lateral impression just before the middle. Lower surface subimpunctate; metasternum profoundly bi-impressed; middle coxæ separated by about one-half the coxal width, front coxæ distinctly but less widely separated. (Pl. IV, fig. 31). Length 1–1.5 mm.

Hab.—Massachusetts, Lowell—"in cellar" (Blanchard); Lawrence—"in powdered lobelia root" and "with *Sitodrepa* in dandelion root" (King); Pennsylvania—Horn collection; Michigan—Detroit (Hubbard and Schwarz).

In some examples the median line of the metasternum and abdomen bears a moderate number of long, curved, suberect, pale yellowish hairs; in other specimens there is no sign of these hairs, and it is therefore probable that it is a male character. The identification of our specimens is established by comparison with a typical example of *costulata* received from Reitter. It has been previously known from Germany and Japan.

C. filiformis Gyll.—Linear, subdepressed, rufotestaceous. Head subtriangular, evenly convex, finely, closely punctate; epistoma moderately dilated at sides, labrum feebly emarginate; eyes very small, distant from the posterior angles. Antennæ shorter than the head and prothorax; first joint large, orbicular; second narrower, broadly oval; joints 3–8 smaller, equal in width, submoniliform; club abruptly 3-jointed, first two joints as wide as long or a little transverse. Prothorax about one-half wider than the head, transverse, narrowed behind, sides rounded anteriorly, faintly sinuate posteriorly; side margins explanate; disk convex, without anterior fovea, posterior transverse groove deep. Elytra elongate, subparallel, but little wider than the thorax, humeral angles right; each with eight rows of coarse punctures at base, and seven posteriorly, the fifth and sixth rows coalescent before the middle; a faint transverse impression—more distant laterally—just before the middle. Mentum, prosternum in front, and metasternum at middle distinctly punctate; abdomen impunctate. Metasternum with a deep fovea each side, connected by a deep groove. (Pl. IV, fig. 32). Length 1.2–1.4 mm.

Hab.—Pennsylvania (Philadelphia; Allegheny); Michigan (Detroit); Missouri.

I have seen very few native specimens, most of those bearing the name of *filiformis* in our collections being either *costulata* or *filum*. It is common throughout Europe. Belon states that the front and middle tibiæ are a little arcuate in the male; the difference between the sexes in this respect must be very slight I think, at least it is scarcely obvious in the specimens at hand.

C. argus Reitt.—Linear, subdepressed, rufotestaceous. Head subtriangular, densely punctate, broadly, feebly impressed between the eyes, the latter very large for the genus, occupying the hind angles; tempora entirely wanting; epistoma moderately dilated at sides, labrum arcuate in front; antennæ short, joints 3–8 submoniliform, not very different in size; club abruptly 3-jointed, joints nine and ten slightly transverse. Prothorax transversely cordate, base and apex subequal; side margin explanate; surface densely punctate, without discal fovea, posterior transverse impression strong and marked by a deeper fovea at its middle. Elytra slightly wider than the prothorax, the margin somewhat obtusely angulate at the humeri, each with eight rows of punctures; intervals narrow, nearly uniform, the seventh slightly more convex. Beneath subimpunctate; metasternum with a slightly curved longitudinal impressed line extending forward from the inner margin of the hind coxæ for about two-thirds its length. First ventral bifoveate between the coxæ and with a transverse impressed line near the middle of its length extending from the side margin nearly to the median line. Front coxæ separated by fully half their width, middle coxæ by about their own width. (Pl. IV, fig. 33). Length 1.3 mm.

Hab.—Michigan (Detroit); Montana (Bonner); Oregon (Le Grande—"in ground cereals"); California (Pomona—on strips of drying yucca pith). It occurs in many parts of Southern Europe, also in Algeria.

The very large eyes occupying the hind angles of the head, and consequent lack of tempora, make this species easy of recognition among those with 3-jointed antennal club.

C. intermedia Belon.—So far as I can discover there is nothing to separate this species from *filum*, except the absence of the anterior discal fovea of the pronotum. In the considerable number of species of *filum* examined, the depth of the fovea varies considerably, and I should not be surprised if *intermedia* merely represented an extreme variation of this sort. I have, however, seen no examples in which the fovea is lacking. Length 1.3 mm.

Hab.—"Amer. Sept."

C. filum Aubé.—Linear, subdepressed, rufotestaceous. Head but slightly longer than wide, subtriangular, with a quite sharply impressed, median, longitudinal sulcus, which is gradually wider posteriorly; surface more or less rugosely punctate, the groove smoother; labrum rounded in front, epistoma moderately dilated at sides; eyes large, occupying the hind angles. Antennæ a little longer and more slender than in *filiformis*, joints 3–9 subequal and evidently longer than wide; club 2-jointed, the joints of about equal width and both longer than wide. Prothorax transversely cordate, sides a little sinuate posteriorly; margin explanate, edge not or scarcely crenulate; surface more or less rugosely punctate, a rather large anterior discal fovea which varies in depth, and a transverse subbasal sulcus which sometimes contains a median fovea. Elytra sublinear, each with seven rows of rather deep, rounded punctures, the intervals nearly equally subconvex, the outer ones as usual tending to become a little more prominent. Beneath subimpunctate, the metasternum and abdomen polished; the former with a rounded or subcordate median area, which is defined by a deep groove.

First ventral with a slightly curved, longitudinal, deeply impressed line extending backward from each coxa nearly to the hind margin of the segment, the surface adjacent declivous, so as to form a rather large excavation, which is broader posteriorly. The following segments are each marked by a transverse, subarcuate, sulciform impression. Front coxæ narrowly but distinctly separated, middle coxæ distant by fully two-thirds their own width. (Pl. IV, fig. 34). Length 1.4-1.6 mm.

Hab.—New York; Canada (Ottawa—in pea straw—Fletcher); Colorado.

This species occurs in many parts of Europe, in Algeria, and is said to be common in Mexico. The dozen examples before me exhibit considerable variation in the width of the prothorax, the depth of the discal fovea, and in the degree of coarseness of sculpture of nearly all parts of the body.

C. elegans Aubé.—Elongate, parallel, subdepressed. Head and prothorax densely, not coarsely punctate; the former very little longer than wide, evenly convex; eyes small, situated at their own length from the hind angles, which are right and narrowly rounded; labrum dilated at sides and inclosing the epistoma. Antennæ passing slightly the middle of the prothorax, rather stout, joints 3–8 about as wide as long, the outer ones a little wider and submoniliform; club abrupt, 3-jointed, the joints of about equal width, the middle one transverse. Prothorax subtrapezoidal, a little wider than the head and about as long as wide, sides nearly straight and convergent from the front angles, the base a little narrower than the apex; surface punctate like the head, a somewhat ill-defined, longitudinal, submarginal impression. Elytra about one-half wider than the prothorax, subparallel, sides feebly rounded, humeri tolerably well defined; each with eight rows of moderately coarse punctures; intervals narrow, the third, fifth and seventh distinctly though not very strongly costiform throughout. Beneath without foveæ or impressed lines, coarsely, closely punctate throughout, except toward the abdominal apex, which is nearly smooth. Front coxæ separated by about one-third their own width, middle coxæ by nearly their own width; hind coxal cavities attaining the sides of the body. First ventral segment longer than the metasternum, and as long at sides as the two following united; segments 2–5 subequal. (Pl. IV, fig. 35). Length 1.3–1.4 mm.

Male.—Front and middle tarsi 2-jointed.

Female.—Front tarsi normal.

Hab.—Washington, D. C.

A small number of specimens from the above locality are all that I have seen from our territory. They vary in some trifling respects from European specimens received from Reitter, but I have no doubt of their identity. *Elegans* has been previously known only from the Mediterranean region.

The coarsely punctate under surface is seen elsewhere among our species only in *Adistemia watsoni*, and the relation between these two is further evident by their near agreement in the peculiar sexual

tarsal characters, and also in the labrum, which encloses the epistoma at the sides. *Elegans*, however, does not share the structural features upon which *Adistemia* has been founded, and is for the present left with *Cartodere*, although an aberrant member of the genus.

ADISTEMIA gen. nov.

The somewhat remarkable divergence from typical *Cartodere* in the structure of the under body seems to require the separation of *C. watsoni* under a new generic title. The characters upon which this new genus rests are chiefly these: Front and middle coxæ contiguous, their cavities separated by a thin depressed lamina which is not visible, or only very indistinctly so without dissection. Hind coxæ subconical and slightly prominent, the cavities falling far short of reaching the sides of the body. Metasternum and first ventral segment connate, the suture entirely obliterated between the coxæ, but visible from the outer side of the coxa to the margin. In no other member of the tribe Lathridiini occurring with us are the front coxæ contiguous, while the other characters above mentioned I have encountered nowhere else in the entire family.

A. watsoni Woll.—Elongate, narrow, depressed, entirely rufotestaceous; head and thorax glabrous, elytra with sparse, extremely short, whitish erect hairs, which are scarcely visible, except in profile, and are then very inconspicuous, except on the declivity. Head nearly twice as long as wide, truncate behind, sides a little rounded and convergent to the insertion of the antennæ; labrum strongly dilated, enclosing the epistoma at sides and equal in width to the head posteriorly; eyes small, situated at nearly twice their length from the hind angles, and at almost twice that distance from the antennæ; surface finely densely punctate, without costæ or impressions. Antennæ a little shorter than the head and prothorax together, the first two joints larger, suboval, the first but little larger than the second; joints 3–5 twice as long as wide, 6–8 shorter, the eighth but slightly elongate; last three joints forming the club, subequal in width, 9–10 slightly longer than wide, eleventh nearly as long as the two preceding united. Prothorax scarcely wider than the head, longer than wide, widest before the middle, sides rounded and posteriorly convergent, surface densely punctate, posteriorly broadly, but not deeply, transversely impressed. Elytra very elongate, subelliptical, each with eight striæ of rather coarse punctures, intervals very narrow, except the third and seventh, which are broader and distinctly costate. Beneath densely punctate throughout, except the last two or three ventral segments, the punctuation finer anteriorly, but quite coarse on the first two ventrals. Front and middle coxæ contiguous or nearly so, their cavities separated by a very thin lamina, which is not distinctly visible; hind coxæ small, subconical and slightly prominent, widely separated. (Pl. IV, fig. 36). Length 1.4–1.65 mm.

Male.—Front tarsi 2-jointed; hind coxæ with a moderately long acute spine on the inner side, ventral surface not ascending at apex.

Female.—Tarsi normal; hind coxæ without spine; ventral surface ascending at apex.

Hab.—Washington, D. C.—"In drugs;" "in dust from feed store;" and "among Alaskan Lepidoptera."

This species was described by Wollaston in 1871 from specimens taken on the interior walls of a house at Funchal, Madiera. Since then it has been recorded from the Canaries, Algeria, Cape of Good Hope, Portugal, Venezuela and Chili.

BELONIA gen. nov.

This genus is erected for the reception of *Cartodere unicostata*, which differs remarkably from every other Lathridiidi known to me by its greatly developed trochanters, these being slender, cylindrical, arcuate, and about equal in length to the fourth ventral segment. This peculiarity, while suggesting *Enmicrus* and allies of the Scydmænidæ, is not as in these latter coupled with other traits which may be considered of tribal value. *Belonia* is, in fact, in most respects, a near ally to *Cartodere*, and only two supplementary characters seem worthy of mention, viz.: the antennæ are much longer and more slender than in any *Cartodere* known to me, the intermediate joints (3–8) being so slender as to almost merit the term filiform; and the prothorax is so small as to give the insect a very singular apect. What weight to attach to these two character cannot be determined without a wider knowledge of the exotic forms of *Cartodere* than I now possess; I suspect, however, that they will prove to be of some significance. I take great pleasure in naming the genus in honor of the distinguished French entomologist and authority on the Lathridiidæ of the world, M. Marie-Joseph Belon of Lyons.

B. unicostata Belon.—Elongate, rufotestaceous, glabrous. Head longer than wide, finely, feebly, subrugosely punctate, and with a short faint longitudinal impression; eyes small, prominent, situated at less than their length from the hind angles; tempora convergent posteriorly; sides before the eyes moderately convergent; epistoma expanded to a width equal to that of the head without the eyes; labrum subtruncate; antennæ distant from the eyes, inserted anteriorly beneath the finely margined sides of the front, passing the hind margin of the prothorax; first joint subglobular, second a little narrower, elongate-oval; 3–8 nearly filiform, the third more than three times as long as wide, the following joints gradually very slightly shorter; club 3-jointed, joints all longer than wide. Prothorax about as long as wide, not wider than the head including the eyes,

sides sinuately parallel in front, deeply constricted near the base, and suddenly narrowed at the front angles to a fine marginal bead, which is of about the width of the neck; surface very finely subrugosely punctate like the head, disk with a broad impression each side anteriorly, these impressions subconfluent at the middle; and a transverse subbasal impressed line which is deeper at its extremities. Elytra elongate-oval, about two and one-half times as wide as the thorax, and more than twice as long as the head and thorax combined; base minutely rectangular each side, humeri not defined, side margin strongly arcuate when viewed laterally; each with eight rows of coarse, deep, closely placed punctures; intervals very narrow, nearly flat, except the sixth, which is costate throughout; there is a small but distinct lateral transverse impression on each elytron before the middle, beginning at about the third stria. Epipluræ rather feebly inflexed and marked with a similar row of punctures. Scutellum not distinctly entering the disk of the elytra. Under surface impunctate; metasternum shorter than the first ventral, the latter with a deep, transverse, nearly straight impressed line just behind the coxæ, and reaching nearly to the sides of the body. Ventral segments 2–4 slightly decreasing in length, fifth a little longer. Front coxæ distinctly though rather narrowly separated; middle coxæ distant by about three-fourths the coxal width. Hind coxal cavities not quite reaching the sides of the body. Trochanters very long, arcuate, cylindrical. (Pl. IV, figs. 37, 37*a*, 37*b*). Length 1.3 mm.

Hab.—Florida (Crescent City—collection Hubbard and Schwarz). Belon records it from Mexico.

The identification of the two examples sent me by Mr. Schwarz is made certain by a comparison with a type of *unicostata* kindly sent me by Belon.

In one of the Florida examples the abdomen is strongly ascending at the apex and the tip concealed; in the other there is no sign of this, and a small sixth segment is exposed. The specimens are very likely male and female, but it is not possible to say if these conditions are constant.

REVELIERIA Perris.

This genus has hitherto contained only a single rare and curious insect—*R. genei* Aubé—which occurs in Spain, Corsica, Sardinia and Northern Africa. The discovery in California of a second species which is certainly congeneric is therefore of much interest. A lengthy generic diagnosis is unnecessary, as there are but two characters of fundamental importance, viz.: the connate elytra, with coarse punctures arranged in more or less irregular series, apparently twelve in number on each. Another character, so rare as to merit especial mention, is the lateral extension of the labrum so as to embrance the sides of the epistoma. I have observed the same structure in *Cartodere elegans* and *Adistemia watsoni*, and it is

worthy of note that both these species depart from their nearer allies and agree with *Revelieria* in the densely punctate lower surface. Other details of structure may be found in the following description:

R. californica sp. nov.—Oval, moderately convex, glabrous, moderately shining, color varying from ferruginous to piceous brown, legs rufous. Head subquadrate, densely punctate, with costæ or impressions; labrum subtruncate in front, embracing the epistoma at sides; epistoma strongly transverse, separated from the front by a distinctly impressed, feebly arcuate line. Antennæ not quite reaching the hind angles of the pronotum, 11-jointed, club 3-jointed; joints 3–8 elongate, subequal in width, the third about twice as long as wide, the following joints gradually very slightly less elongate; club rather abrupt, the first two joints about as wide as long, the last almost as long as the two preceding together; eyes rather small, not very prominent, situated at a little less than their length from the antennæ; tempora about one-half the length of the eyes. Prothorax but little wider than the head, nearly square, the sides parallel and nearly straight; surface densely, rather coarsely punctate, disk without costæ or foveæ, but with a rather shallow transverse basal impression, which is a little deeper at the middle. Scutellum small but distinct. Elytra ovate, convex, but not at all gibbous; about one-half wider than the prothorax; margin distinctly but not broadly explanate, base slightly wider than the contiguous base of the prothorax, basal angles a little obtuse; sides nearly straight and divergent for about one-fourth their length, thence subparallel for a little and gradually more strongly arcuate to apex. Each elytron bears about twelve lines of somewhat coarse punctures, which are more or less confused toward the base, but become fairly regular and a little finer apically. Under surface coarsely, densely punctate anteriorly, the abdomen gradually more finely and less closely toward the apex. Metasternum at sides subequal in length to the first ventral segment, but much shorter than the latter along the median line; episternal sutures nearly obliterated. First ventral at sides subequal to the three following segments united, the intercoxal process broad, truncate; ventral sutures normally deep. Front coxæ separated by about two-thirds their own width, middle coxæ by nearly their own width. Legs moderately stout; the tibiæ a little arcuate toward the base; first joint of tarsi slightly longer than the second, the third equal to the first two combined. (Pl. IV, fig. 38). Length 1.25–1.5 mm.

Hab.—California (Los Gatos—Hubbard and Schwarz; Ojai Valley).

Specimens from the latter locality were taken by me in March, and if I remember correctly, occurred together with *Metophthalmus rudis* in a dry woody fungus.

Californicus differs greatly from *genei* in its perfectly glabrous surface, non-gibbous less broadly oval and much less coarsely punctate elytra and larger scutellum.

Tribe IV. Corticariini.

Briefly diagnosed, this tribe, as represented in our fauna, is characterized by the epistoma being on the same plane with the front

and much smaller than the labrum; antennæ 11-jointed (10-jointed in *Fuchsina*), club usually 3-jointed, rarely 2-jointed. Prothorax more or less crenulate or denticulate at sides and with nearly always a rounded or transverse impression before the base. Body devoid of costæ, the hairs arranged serially on the elytra and either suberect and bristling or much inclined. Front coxal cavities separated by a prosternal lamina, which is often difficult to observe, the coxæ being frequently contiguous or subcontiguous on their free inner faces, the cavities closed behind. Abdomen consisting of five or six visible segments.

Two only of the five genera recognized by Belon inhabit North America, viz.: *Corticaria* and *Melanophthalma*. To these I have to add a new genus—*Fuchsina*—based on a singular blind species from California.

As now treated in the books, *Corticaria* and *Melanophthalma* are primarily separated by the number of abdominal segments; *Corticaria* having six in the male and five in the female, while *Melanophthalma* shows six in both sexes. This method of distinction serves very well except for those species of *Melanophthalma* having a 2-jointed antennal club (subgenus *Cortilena*), in which, so far as my observation goes, the sixth segment is visible in the female, but quite uniformly concealed in the male.

Our three genera may then be separated as follows:

Antennæ 11-jointed, eyes large.
  Abdomen of female with five segments, a sixth usually visible in the males; antennal club always 3-jointed.....**Corticaria.**
  Abdomen of female with six segments, that of the male also with six segments, except in the subgenus *Cortilena*, in which the antennal club is 2-jointed.....**Melanophthalma.**
Antennæ 10-jointed, eyes wanting.....**Fuchsina.**

It should be observed that the so-called sixth ventral segment in the males of *Corticaria* is probably, as suspected by Belon, not a true segment of the abdomen, but only a part of the genital armature; and while usually sufficiently extended to be plainly visible, it is not infrequently very indistinct or quite concealed. On the other hand, this pseudo segment is occasionally revealed in the female, and apparently with some constancy in one species (*brevicornis*). In *Melanophthalma* the sixth segment is, perhaps, a true external sclerite, at all events it is almost invariably present (except as above noted), and its visibility is seemingly independent of the

extrusion of the genitalia. In addition to these differences in ventral formation, the two genera differ in certain other details of structure, of which the following are most noteworthy.

In *Melanophthalma* the body is, as a rule, more oval, the elytra often visibly, though usually very slightly, truncate at tip, exposing more or less the tip of the abdomen; the lateral transverse prosternal fossa is glabrous, and the secondary sexual characters are of a different sort. Further details will be alluded to in the remarks which follow under the generic titles.

CORTICARIA Marsh.

This genus, as now limited, is quite homogeneous in general structure and facies, while involving a moderate amount of variation in details of form and sculpture. The form is more or less elongate, varying from oblong-ovate to subparallel, and from moderately convex to quite strongly depressed. Pubescence more or less long and conspicuous, serially arranged on the elytra. In some species the hairs of the interspaces are distinctly longer and less inclined than those of the striæ, but in the majority there is not much difference in this respect, all the hairs being more recumbent. The head is transverse, more or less distinctly though never densely punctate; eyes, as a rule, large and prominent, rather small in *inopia* and *temporalis;* tempora always visible, but very variable in length, never (except in *temporalis*) evidently longer than one-third the diameter of the eye, as viewed from above. Antennæ usually not quite reaching the hind angles of the prothorax, 11-jointed, club 3-jointed; first joint strongly dilated, subglobular, or a little elongate; second shorter and much narrower, always longer than wide; third subequal in length to the second but more slender; fourth to eighth decreasing in length, the seventh nearly always visibly longer than wide, the eighth usually subglobular or slightly tranverse; tenth and eleventh feebly obconic, occasionally distinctly elongate, but usually as wide as, or a little wider than long; eleventh always longer than wide, ovate, more or less obliquely pointed. Prothorax usually subcordate, more or less transverse, front angles obtuse, rounded; hind angles more or less obtuse, usually defined by a somewhat prominent denticle; surface without carinæ, and almost invariably with a more or less distinct rounded or transverse fovea before the base; sides crenulato-denticulate, more strongly so posteriorly. Elytra elongate ovate or subparallel, each with eight series of punc-

tures, which are moderately large toward the base, but become finer apically; interspaces with a single series of punctures (except *ferruginea*), which are, in a few species, nearly as coarse as those of the striæ, but are usually distinctly finer. Prosternum usually distinctly longer before the coxæ than the coxal length; more or less roughly punctate, and with a transverse pubescent fossa exterior to the anterior limits of the coxæ. Coxal cavities narrowly separated, the coxæ prominent and contiguous or subcontiguous on their free faces. Metasternum of variable length, usually longer between the coxæ than the post-coxal length of the first ventral,* but occasionally subequal to, or even shorter than the first ventral; punctuation distinct at sides, generally finer and sparser toward the middle, especially posteriorly; median line distinctly impressed in posterior half. Middle coxæ variably separated. There seems to be a little individual variation in this particular, but after due allowance has been made, it is still a character of considerable utility. Abdomen consisting of five segments, a sixth frequently visible in the male and very rarely in the female. The first segment is subequal in length to the next three together, these latter much shorter, slightly decreasing in length, the fifth usually about one-half longer than the fourth, and frequently marked with a median or apical fovea or impression, which varies in the sexes. The femora vary from robust to slender; the second joint of the tarsi is shorter than the first, the third subequal to the first two united.

The sexes are always easily separable. Aside from the sculpture of the last ventral just alluded to, the males have the first joint of the front tarsi distinctly dilated, and the first joint of the middle tarsi very slightly so; the front and middle tibiæ, and rarely the hind tibiæ, are a little curved or bent at tip, or at least more or less sinuate internally before the apex, and with a small mucro or acute denticle at the inner apical angle; the fifth ventral is occasionally shorter, and more broadly rounded or subtruncate than in the female.

There is little doubt that all the forms mentioned below are valid species, but their tabulation has proved a matter of some difficulty, and its use will not be always satisfactory, unless supplemented by a careful study of the descriptions; even then, a comparison with types will, perhaps, be necessary in difficult cases.

* This method of comparison of the lengths of the metasternum and first ventral segment must be kept in mind in reading the following descriptions.

Pubescence more conspicuous, the hairs of the elytral intervals generally longer, more erect and bristling than those of the striæ; middle coxæ narrowly separated—seldom by more than ¼ or ⅓ their own diameters—size moderate to large, at least moderately convex.....1.

Pubescence shorter, more appressed, nearly uniform throughout; middle coxæ (with few exceptions) more widely separated, usually by nearly ½ their own diameters, size very variable, form often depressed.....2.

1. Punctures of striæ and intervals not very different in size, somewhat confused.

Front and middle tibiæ of ♂ not bent at tip, length of metasternum between the coxæ greater than the post-coxal length of the first ventral segment.....**pubescens.**

Front tibiæ of ♂ a little bent at tip, metasternum scarcely longer than the first ventral segment.....**rudis.**

Punctures of elytral intervals distinctly finer than those of the striæ, not noticeably confused; front and middle tibiæ of ♂ bent and mucronate internally at tip.

Metasternum subequal in length to the first ventral segment.

First joint of antennal club not distinctly longer than wide; prothorax cordate; color pale brownish yellow.....**fulva.**

First joint of antennal club distinctly elongate; prothorax feebly cordate; color piceous brown, the elytra often paler.....**varicolor.**

Metasternum distinctly longer than the first ventral segment; form narrow, elongate, prothorax nearly as wide as the elytra.....**parallela.**

2. Metasternum subequal to or shorter than the first ventral.

Size large (2.3 2.6 mm.), pronotal fovea obsolete, joints of antennal club all longer than wide, body winged.....**valida.**

Size small (1.6 mm.), pronotal fovea distinct, first two joints of antennal club transverse, body apparently apterous.....**inopia.**

Metasternum distinctly longer than the first ventral.....3.

3. Pubescence fuscous or brownish, less inclined than in the following species; middle coxæ separated by nearly their own width; form slender, strongly depressed; color piceous brown or nearly black..**planula.**

Pubescence cinereous or fulvous (somewhat darker in *salpingoides*), middle coxæ separated by at most but little more than ½ their own diameters....4.

4. Prosternum before the coxæ nearly twice as long as the longitudinal diameter of the coxa; last ventral of ♀ long, broadly, feebly impressed at tip. **salpingoides.**

Prosternum shorter before the coxæ, seldom distinctly more than one and one-half times the coxal length; color rufotestaceous to brown, rarely piceous (*dentigera* and some *serricollis*).....5.

5. Claws of hind tarsi larger (at least in the ♂) and unequal, the inner one longer and sinuate at tip.....8.

Claws normal and subequal on all the feet.....6.

6. Last ventral plane, or with at most only an ill-defined apical impression, at least in the ♀ and probably in both sexes [the ♀ of *amplicollis* has not been seen; it may prove to be an exception].....9.

Last ventral more or less distinctly foveate or impressed in both sexes [in *columbia* and *carolina*, males only have been seen].....7.

7. Color piceous brown.

Last ventral of ♂ with a moderate apical impression which is not more rugose.....**columbia.**

Last ventral (♂) with a rather shallow transverse apical impression which is roughened; (♀) with a deep transverse apical polished fovea. **serricollis.**

Color rufotestaceous.

Last ventral (♂) with a deep subtransverse fovea reaching from the apex nearly to the base of the segment; (♀) with a still larger, more profound fovea. **poculifera.**

Last ventral (♂) with a well-defined transverse apical impression; (♀) with a feeble median impression; prothorax distinctly narrower than the elytra at the humeri, tempora long. **prionodera.**

Last ventral (♂) with a small but well-defined transverse fovea, which occupies fully two-thirds the length of the segment; prothorax subequal in width to that of the elytra at the humeri; tempora short. **carolina.**

8. Prothorax densely cribrate-punctate, last ventral of ♂ rather feebly impressed at the middle of the apical margin. **cribricollis.**

9. Prothorax large, strongly rounded at sides, widest at middle and scarcely at all narrower than the elytra at base. **amplicollis.**

Prothorax widest at a greater or less distance before the middle, never as wide as the elytra at base. 10.

10. Size smaller, always less than 2 mm. 11.

Size larger (2–2.5 mm.), except some *dentigera* or very small specimens of *serrata*, sculpture of both upper and under surface coarser and closer (except *occidua*).

Tempora very short, scarcely as long as the eighth antennal joint. **serrata.**

Tempora decidedly longer, usually evidently longer than the eighth antennal joint.

Prothorax three-fourths as wide as the elytra.

Punctuation coarser and denser throughout.

Size larger, elytra uniformly brown or piceous brown. **incerta.**

Size smaller, rufocastaneous, elytra black in apical half. **apicalis.**

Punctuation comparatively fine and sparse. **occidua.**

Prothorax but little more than half the greatest width of the elytra, color piceous black. **dentigera.**

11. Femora very slender, head but little narrower than the prothorax, sides of the latter strongly denticulate. **tenuipes.**

Femora as usual, head much narrower than the prothorax, the sides of the latter more finely serrulate. 12.

12. Eyes very small, distant on the front by fully four times their longest diameter as seen from the front; tempora nearly as long as the eye. **temporalis.**

Eyes normally large, distant on the front by but little more than twice their own diameter; tempora much shorter. 13.

13. Fifth ventral segment not longer than the fourth, the sixth usually distinctly visible, especially in the ♂; last three joints of antennal funicle transverse. **brevicornis.**

Fifth ventral at least one-half longer than the fourth, the sixth not visible, or only accidentally so; outer joints of funicle not evidently transverse, or with at most the eighth joint slightly transverse.

More parallel and depressed, pubescence longer and less appressed, elytral interspaces with a single regular series of punctures, color varying from yellowish to reddish testaceous..... **elongata.**

Less parallel and less depressed, pubescence shorter and more appressed, elytral interspaces more or less irregularly punctulate, color ferruginous brown..... **ferruginea.**

C. pubescens Gyll.—Fuscous to fusco-testaceous, the paler specimens with the disk of the elytra often broadly infuscate; legs and antennæ rufotestaceous; pubescence long and conspicuous, not recumbent. Head narrower than the prothorax, moderately coarsely but not closely punctate, tempora long, a little divergent, about one-third the length of the eye. Antennæ reaching the hind angles of the prothorax, joints all longer than wide. Prothorax but little more than half as wide as the elytra, moderately transverse, sides rather strongly rounded, widest in front of the middle, narrowed posteriorly, margin irregularly serrulate; surface strongly punctate, the punctures distant on the average less than their own diameters, posteriorly foveate. Elytra elongate-oval, convex, coarsely punctate-striate; the punctures of the intervals somewhat variable, but usually nearly as strong as those of the striæ, and frequently somewhat confused. Sterna moderately coarsely punctate; first ventral less coarsely and closely but distinctly punctate; following segments finely, sparsely punctulate. Legs slender; middle coxæ distant by about one-fourth the coxal width; metasternum distinctly longer between the coxæ than the post-coxal length of the first ventral segment.

Male.—Front and middle tibiæ scarcely at all bent at tip, the inner margins nearly straight, the inner apical angle very feebly mucronate; first joint of front tarsi dilated, first joint of middle tarsi not dilated; last (fifth) ventral subequal in length to the two preceding, apex subacuminate, disk transversely impressed toward the base.

Female.—Tibiæ with the inner apical angle rounded, tarsi unmodified; last ventral shorter and with a deep median fovea; penultimate segment more broadly and feebly impressed. (Pl. IV, fig. 39).

Length 2.3–3 mm.

Hab.—Massachusetts (borders of salt marsh near Cambridge); New York; Pennsylvania; Michigan (Marquette); Northern Illinois; Iowa.

This is our largest species and one very easy of recognition by its size and conspicuously long and plentiful pubescence, not to mention the sexual characters, which are quite unique. It is widely distributed throughout Europe, and has, indeed, become quite cosmopolitan.

C. rudis sp. nov.—Yellowish testaceous, elytra strongly shining; prothorax alutaceous, less shining; pubescence moderately long, suberect, the hairs from the strial punctures shorter and more inclined. Head narrower than the prothorax, coarsely punctate; tempora well developed, slightly divergent; joints of antennæ all longer than wide. Prothorax of the same form as in *pubescens*, very coarsely but not densely punctate, posteriorly foveate, sides irregularly serrulate. Elytra elongate-oval, convex, the strial punctures not coarse, those of the intervals but little finer. Sterna very coarsely, rather closely subrugosely punctate, first ventral sparsely but distinctly punctate, following segments more finely

punctate. Legs rather slender, front coxæ distant from the front margin of the prosternum by a little more than their own length, middle coxæ separated by fully one-fourth the coxal width; metasternum very little longer than the first ventral.

Male.—Front and middle tibiæ rather feebly, but obviously bent and mucronate internally at tip; first joint of front tarsi dilated; last ventral not longer than the preceding, the tip elevated and subacuminate.

Female—Not seen.

Length 2.5 mm.

Hab.—New Mexico (Coolidge). One example sent by Mr. Wickham.

This species is nearest *pubescens*, but is at once separable by the shorter metasternum, very coarsely punctate prothorax, finer elytral punctuation, pale color (perhaps not constant) and sexual characters. The male tibiæ are here fashioned as in all other members of the genus except *pubescens*, but are less strongly sinuate and mucronate internally at tip than usual. The structure of the tip of the fifth ventral is nearly as in *pubescens*, and is not seen elsewhere.

C. fulva Com.—Fulvous or yellow-brown, rather slender, moderately convex, pubescence fulvous, long, plentiful, the hairs of the intervals longer and more erect. Head about as wide as the base of the prothorax, very finely sparsely punctulate; tempora moderate, parallel; eyes rather small, not much more prominent than the tempora. Antennæ with the first joint of club as broad as long, second a little transverse, all the other joints longer than wide, the eighth but slightly so. Prothorax cordate, sides rather distantly serrulate, sometimes subangulate near the middle; punctuation distinct and moderately close but not coarse, posteriorly foveate. Elytra rather finely seriately punctate, the intervals nearly as strongly punctate. Beneath subobsoletely punctate; metasternum subequal in length between the coxæ to the post-coxal part of the first ventral, but distinctly shorter than the first ventral along the median line. Middle coxæ separated by nearly one-third the coxal width; last ventral in both sexes not quite so long as the two preceding united. Legs slender.

Male.—Front and middle tibiæ sinuate and mucronate internally at tip; last ventral evenly rounded at tip, the apical margin slightly reflexed; surface scarcely at all impressed. (Pl. IV, fig. 40).

Female.—Tibiæ simple, last ventral nearly as in the male, the apical margin less visibly reflexed.

Length 1.7—2 mm.

Hab.—A cosmopolitan species of which I have seen specimens from Massachusetts, Virginia, Kentucky, Michigan and Lower California (San José del Cabo).

The small size, pale color, feebly punctate inferior surface and wider ninth and tenth antennal joints will readily separate from all other similarly pubescent species.

C. varicolor sp. nov.—Color varying from yellowish brown to piceous, often uniform throughout, but more commonly piceous brown, with the elytra

(except the suture), antennæ and legs paler. Form moderately stout and convex; pubescence cinereous, rather long and conspicuous, the hairs of the elytral intervals shorter and more inclined. Head about four-fifths as wide as the prothorax, strongly but sparsely punctate; tempora parallel, their length fully one-fourth that of the eye as seen from above. Antennæ reaching the hind margin of the prothorax, the joints all longer than wide. Prothorax convex, a little wider than long, widest before the middle; sides rather strongly rounded, narrowed behind, margin finely serrate; surface moderately strongly punctate, the punctures separated by fully their own diameters; posterior fovea small and not deeply impressed. Elytra elongate-oval, convex, striæ distinctly impressed; intervals slightly convex, their punctures decidedly finer than those of the striæ. Beneath coarsely, rather closely punctate, more finely and sparsely along the median line; the first ventral more finely and sparsely than the metasternum, the following segments finely punctate. Metasternum subequal to the first ventral; middle coxæ narrowly separated about one-sixth their own diameter. Legs short.

Male.—Front and middle tibiæ sinuate and strongly mucronate within at tip; first joint of front tarsi quite strongly, that of middle tarsi distinctly though feebly dilated; last ventral but little longer than the fourth, the apex broadly rounded, surface not impressed.

Female.—Tibiæ simple; tarsi not dilated; last ventral but little shorter than the two preceding united, more narrowly rounded at apex, not impressed. Length 2.1–2.3 mm.

Hab.—Michigan (Detroit, Saulte Ste Marie); Dakota (Bismarck); Colorado (Garland); Montana (Bear Paw Mt.).

The variations in color in this species are greater than in any other known to me, but I have not been able in the material at my command to discover any structural characters upon which to base a separation. The pubescence is somewhat less conspicuous, and the femora much stouter than in any of the preceding species.

C. parallela sp. nov.—Rufotestaceous, elongate, parallel, convex; pubescence sparse, cinereous, the hairs from the strial punctures subrecumbent, those from the intervals more distant, suberect. Head nearly as wide as the prothorax, sparsely punctate; eyes large, prominent; tempora moderate, parallel; antennal joints all longer than wide. Prothorax broader than long, nearly as wide as the elytra; sides strongly, nearly evenly rounded, margin serrulate; surface moderately punctate, the posterior fovea small and faintly impressed. Elytra elongate, subparallel; striæ scarcely impressed, punctures moderately large and approximate, except toward the apex; punctures of intervals finer and much more distant. Beneath coarsely but not closely punctate, abdomen sparsely, finely punctate, except the first ventral, on which the punctures are coarser though sparse. Metasternum longer than the first ventral; middle coxæ very narrowly separated; fifth ventral a little longer than the fourth in both sexes, not impressed. (Pl. IV, fig. 41).

Male.—Front and middle tibiæ very feebly sinuate and with a small mucro within at tip.

Female.—Tibiæ unmodified. Length 2 mm.

Hab.—Colorado (Garland); Alberta (Banff Springs). Two examples of this interesting species have been sent by Mr. Schwarz. It should be easily recognized.

C. valida sp. nov.—Brownish testaceous, prothorax sometimes darker; surface shining, the prothorax finely alutaceous; form moderately elongate and convex; pubescence fine, short, sparse and decumbent throughout. Head four-fifths as wide as the prothorax, strongly, rather closely punctate; eyes prominent, tempora parallel and about one-third as long as the eye. Antennæ about reaching the hind margin of the prothorax, all joints longer than wide. Prothorax wider than long, widest before the middle, sides rather strongly rounded in front, and arcuately convergent behind; hind angles obtuse, serrulation of margin feeble; surface with moderate punctures, which are distant on the average by their own diameters; basal impression nearly wanting. Elytra oblong, elongate, a little broader posteriorly, sides feebly rounded, apex very obtusely rounded; striæ not impressed, their punctures rather fine, those of the intervals still finer. Prosternum with very few widely scattered punctures; metasternum sparsely but rather coarsely punctate at sides, nearly smooth at middle; abdomen very finely and sparsely punctulate throughout, the first ventral not much more distinctly so than the following segments. Middle coxæ separated by scarcely one-sixth their own width. Metasternum subequal in length to the first ventral at sides, distinctly shorter than the first ventral along the median line. Femora moderately stout. (Pl. IV, fig. 42).

Male.—Front and middle tibiæ sinuate and mucronate within at tip; last ventral short, very broadly sinuately truncate at apex; a sixth segment visible in all the specimens examined.

Female.—Tibiæ simple; last ventral longer, with a small punctiform fovea at the middle of the apical margin; sixth ventral not exposed.

Length 2.3-2.6 mm.

Hab.—N. Illinois; Montana (Bear Paw Mt.—Hubbard and Schwarz); Colorado (Garland—Hubbard and Schwarz); British Columbia—Horn collection.

This is—next to *pubescens*—our largest species. Its size, very sparse and fine pubescence, non-foveate pronotum, short metasternum and elongate joints of antennal club, form a group of characters which make its recognition perfectly simple.

C. inopia sp. nov.—Rufotestaceous, convex, pubescence short and much inclined, nearly uniform throughout. Head sparsely, finely punctate; eyes small and less prominent than usual, the tempora a little less prominent than the eyes and moderate in length. Antennæ nearly reaching the hind angles of the prothorax, joints seven and eight fully as wide as long, the first two joints of the club distinctly transverse. Prothorax one-fourth wider than long and widest before the middle, base a little narrower than the apex, sides moderately rounded, margin serrulate; surface more strongly punctate than the head, but not closely so; posterior fovea distinct, but small and shallow. Elytra one-half wider than the prothorax, elongate ovate, widest at the middle, humeri broadly rounded; striæ vaguely impressed, punctures moderate, those of the intervals

finer; all finer apically as usual. Beneath sparsely, finely punctate; middle coxæ distant fully one-third the coxal width; metasternum distinctly shorter than the first ventral segment. Last ventral unimpressed in both sexes, a little longer in the female, in which it is but little shorter than the two preceding segments united. (Pl. IV, fig. 43).

Male.—Front and middle tibiæ a little sinuate and mucronate within at tip.

Female.—Tibiæ simple.

Length 1.6 mm.

Hab.—Two examples only have been seen, a male collected by Hubbard at Lake Tahoe, Cal., and a female in the Horn collection from Western Nevada—very probably also from the immediate vicinity of the same lake.

The metasternum is shorter than in any other known species in our fauna, and this, with the subobsolete humeri and the (apparently) connate elytra, indicate that it is nearly, if not completely, apterous.

C. planula sp. nov.—Elongate, depressed, shining, piceous or rufopiceous, legs and antennæ a little paler; pubescence dark, short, moderately inclined, though less so than in the following species. Head sparsely punctate; eyes large, prominent; tempora very short but evident; antennæ scarcely reaching the hind angles of the prothorax, joints 7–10 usually nearly or quite as wide as long, the proportions varying slightly in different individuals. Prothorax cordate, slightly wider than the head, three-fourths as long as wide, sides rather strongly rounded in front, convergent behind; margins finely serrulate; surface more strongly and closely punctate than the head, the punctures varying from somewhat less to rather more than their own diameters apart; basal fovea large and deep. Elytra elongate-oblong, one-fourth wider than the prothorax, sides parallel and feebly rounded; humeri prominent and narrowly rounded, apex obtusely rounded; striæ feebly impressed, rather finely punctate, intervals more finely uniseriately punctate. Prosternum quite strongly punctate; metasternum finely punctate at sides, more sparsely so at middle; ventral segments all very finely, sparsely punctulate. Prosternum fully twice as long before the coxæ as the coxal length; middle coxæ separated by nearly their own diameters. Metasternum longer than the first ventral along the median line, and consequently much longer at sides than the post-coxal portion of the segment. Legs slender. (Pl. V, fig. 44).

Male.—All the tibiæ rather feebly sinuate and mucronate internally at tip; fifth ventral short, impresso-emarginate at apex.

Female.—Tibiæ simple; fifth ventral longer, not impressed, the apex broadly subangulate.

Length 2–2.2 mm.

Hab.—California (Pasadena, Pomona, Ojai Valley); Colorado (Leadville, 10000–11000 ft.—Wickham); Montana (Assiniboine and Bear Paw Mt.—Hubbard).

This species is certainly one of the most singular and easily recognized in our fauna. It is more strongly depressed than any other, and the dark suberect pubescence, the very long prosternum

before the coxæ, the widely separated middle coxæ, the modified hind tibiæ in the male, and the angulate fifth ventral in the female are all characters either peculiar to this species or but faintly indicated elsewhere.

C. salpingoides Mots.—Elongate, parallel, subdepressed, shining, piceous brown, humeri faintly rufous, legs and antennæ brown; pubescence obscure in color, short and much inclined. Head sparsely, finely punctate; eyes moderate, tempora short but distinct. Antennæ nearly reaching the hind margin of the prothorax, joints 8-10 fully as wide as long. Prothorax subcordate, distinctly wider than long, sides moderately rounded in front, convergent posteriorly, faintly sinuate before the hind angles, which are distinct and a little obtuse; margin finely serrulate; surface moderately punctate, basal fovea moderately deep and somewhat produced laterally. Elytra elongate, subparallel, sides broadly rounded; striæ feebly impressed, punctures moderate, those of the intervals finer. Beneath sparsely punctate, the punctures of the prosternum largest, those of the metasternum finer; ventral segments very finely and sparsely punctulate throughout. Prosternum a little less than twice as long before the coxæ as the coxal length; middle coxæ distant slightly more than one-half the coxal width. Metasternum longer than the first ventral at sides, but not evidently so along the median line. Legs moderately slender.

Male.—Not seen.

Female.—Tibiæ simple; fifth ventral but little shorter than the two preceding united, and with a somewhat ill-defined apical impression.

Length 2.4 mm.

Hab.—British Columbia (Stikeen River—Wickham).

It is by no means certain that this is the true *salpingoides*, but the description applies very well in a general way, except as to size—Motschulsky's measurements indicating a species a little under 2 mm. in length—and I have chosen to use this name rather than coin a new one. *Salpingoides* was described from California.

The species above characterized is nearest *planula*, with which indeed it agrees well in color, sculpture and general form. It is, however, distinctly less depressed, the prothorax is less strongly cordate and is a little more transverse, the prosternum is shorter before the coxæ, the middle coxæ are less widely separated, the metasternum is relatively shorter, and the fifth ventral of the female is longer and differently formed.

C. columbia sp. nov.—Oblong-ovate, moderately shining, piceous brown, humeral umbones a little paler, legs and antennæ rufous; pubescence recumbent, short, pale and inconspicuous. Head sparsely, finely punctate; eyes moderate; tempora short but distinct; antennæ not quite reaching the hind margin of the prothorax, the eighth joint as wide as long, the ninth and tenth a little transverse. Prothorax subcordate, widest but little before the middle, sides rather strongly rounded anteriorly, nearly straight and moderately convergent poste-

riorly, the hind angles obtuse; side margins rather coarsely serrate, especially posteriorly; surface moderately strongly punctate, the punctures mutually distant by about their own diameters; basal fovea moderately strong, not produced laterally. Elytra about two-fifths wider than the prothorax, oblong-ovate, the striæ scarcely impressed, the punctures of the intervals evidently finer than those of the striæ toward the base, but very little so apically. Prosternum coarsely, quite closely punctate; the metasternum nearly as coarsely but less closely punctate at sides, sparsely, more finely punctate at middle. First ventral segment finely, sparsely punctate, following segments indistinctly very sparsely punctulate. Middle coxæ distant by about one third their width; metasternum subequal to first ventral at sides. Legs moderate. (Pl. V, fig. 45).

Male.—Front and middle tibiæ rather strongly bent and mucronate within at tip; fifth ventral a little longer than the fourth and distinctly transversely impressed at apex.

Female.—Not known.

Length 2.1 mm.

Hab.—British Columbia (Glacier). A single male in the Hubbard and Schwarz collection.

C. serricollis Lec.—Elongate, subparallel, rufocastaneous to piceous brown, pubescence recumbent. Head a little narrower than the prothorax, sparsely, finely punctate; eyes moderately prominent, tempora distinct; antennæ scarcely longer than the thorax itself, the first two joints of club slightly transverse. Prothorax a little wider than long, widest a little before the middle, sides irregularly but not strongly serrulate, hind angles not very distinct; surface not closely punctate, the punctures distant by about their own diameters; a basal not very deep fovea, which is laterally prolonged. Elytra but little wider than the prothorax; striæ scarcely impressed, the punctures moderate at base, growing feeble toward the tip; interspaces finely serially punctulate. Prosternum a little longer before the coxæ than the coxal length, sparsely, coarsely punctate in front, nearly smooth at sides. Middle coxæ separated by about two-fifths their own width. Metasternum a little longer than the first ventral at sides, of about the same length on the median line, its surface sparsely, finely punctate at the middle, more coarsely but still sparsely at sides. Abdomen very finely, sparsely punctulate, the punctures of the first segment only very slightly stronger than on the following segments. (Pl. V, fig. 46).

Male.—Front and middle tibiæ distinctly, hind tibiæ slightly, bent at tip, with the inner apical angle mucronate; fifth ventral broadly, feebly impressed toward the apex, the impressed surface a little roughened.

Female.—Tibiæ unmodified; fifth ventral with a rather large and deep transverse fovea occupying the apical two-thirds of the segmental length; the surface of the fovea not roughened.

Length 2.1–2.3 mm.

Hab.—Lake Superior; Canada; New Hampshire.

Judging from the number of specimens seen—six only—this is far from being a common species, and is evidently confined to the northern portions of our territory. Of the six examples seen one only is a male, and while coming from the type locality (Lake

Superior), and agreeing in general structure and facies, there are two or three differences, not elsewhere recognized as sexual, which indicate the possibility of its not being the true male of *serricollis*. In this male all the femora are stouter than in any of the five females, the middle coxæ are more narrowly separated and the pronotal fovea is less distinct and not evidently produced laterally.

The two type specimens in the LeConte collection differ from each other somewhat, notably in the length of the prosternum before the coxæ, and in its sculpture; and in one of them the fifth ventral is compresso-carinate at tip—probably a malformation.

More specimens are necessary before we can decide whether these variations are individual or specific.

C. poculifera sp. nov.—Elongate, moderately convex, rufotestaceous; pubescence of moderate length, recumbent. Head finely, sparsely punctate; eyes rather small; tempora longer than in allied species, being about one-fourth the length of the eye. Antennæ moderate, first two joints of club about as long as wide. Prothorax one-third wider than long, subcordate, side margins denticulate, more strongly so toward the base; surface rather sparsely punctate, the punctures separated on the average by about twice their diameters; antebasal fovea moderately impressed and vaguely produced toward the sides. Elytra three times as long as the prothorax and nearly one-third wider; sides subparallel and broadly arcuate; striæ distinctly though lightly impressed; intervals feebly convex, with the usual series of finer punctures, which, like those of the striæ, become feebler and smaller apically. Sterna sparsely, rather coarsely punctate, the metasternum more finely at the middle. Abdomen very sparsely finely punctulate, the first segment a little more distinctly so. Metasternum distinctly longer than the first ventral at sides. Middle coxæ separated by about one-half the coxal width. Legs moderate. (Pl. V, fig. 47).

Male.—Front and middle tibiæ slightly bent at tip and internally mucronate; hind tibiæ apparently very feebly mucronate; fifth ventral with a large moderately deep subtransverse fovea, which occupies the entire segmental length.

Female.—Tibiæ unmodified; fifth ventral a little longer than in the male, and with a still larger and very deep fovea.

Length 2–2.2 mm.

Hab.—Western Nevada. 13 examples.

There will be no difficulty in recognizing this species among any now known to us, by the very large and deep fovea of the last ventral segment.

C. prionodera Lec.—Elongate, feebly convex, rufotestaceous; pubescence cinereous, recumbent. Head more strongly and closely punctate than in the preceding allied species, the punctures being separated by rather less than their own diameters; tempora well developed, fully one-fourth as long as the eyes; antennæ moderate, the ninth and tenth joints subquadrate. Prothorax subcordate, but little wider than the head and a little wider than long; side margin

more strongly denticulate than usual; surface quite closely punctate, the punctures larger and subrugose at sides, finer along the median line, distant as a rule by less than their own diameters; antebasal fovea distinct but not deep. Elytra oblong, sides parallel and broadly arcuate, apex obtusely rounded; striæ scarcely impressed, punctures moderate, finer apically as usual. Prosternum rather coarsely, mesosternum equally coarsely but more closely, metasternum less coarsely and rather sparsely punctate; abdomen finely, very sparsely punctate, the first segment more distinctly so. Metasternum longer than the first ventral segment; middle coxæ separated by fully one-half the coxal width. Legs rather slender.

Male.—Front and middle tibiæ bent at tip and mucronate within, the hind tibiæ very feebly but visibly bent, the mucro apparently present but indistinct; fifth ventral scarcely longer than the fourth, and with a distinct transverse apical impression occupying about three-fourths the length of the segment.

Female.—Tibiæ simple; fifth ventral longer and with a moderately large but somewhat vague discal impression.

Length 2 mm.

Hab.—California—San José (type in LeConte collection), Santa Cruz Mts. and Los Gatos.

I have seen but three examples aside from the LeConte type, all—as will be seen from the above localities—coming from a limited area in the middle coast region of California. This species has been set down in late lists as a synonyn of *serrata;* this course, however, is entirely in error, as the two species are perfectly distinct. They may at once be separated by the relatively long tempora in *prionodera*, these being fully one-fourth the length of the eye, while in *serrata* they are excessively short. *Prionodera*, moreover, is less robust, the head is nearly as wide as the prothorax, the prothorax is less transverse, less closely punctate, and more strongly denticulate at sides. In *serrata* the fifth ventral of the female is scarcely at all impressed, the hind tibiæ are not in the least modified at tip in the male, and the front and middle tibiæ in the same sex are much less evidently bent at tip than in *prionodera.*

C. carolina sp. nov.—Oblong-ovate, robust, moderately convex, rufotestaceous; pubescence fulvo-cinereous, recumbent. Head numerously punctate; eyes moderately prominent; tempora much shorter than in *prionodera*, but not quite so short as in *serrata*. Antennæ moderate, eighth joint subglobular, ninth and tenth subquadrate. Prothorax large, transverse, nearly as wide as the elytra at the humeri, widest a little before the middle, sides strongly rounded, base a little narrower than the apex; margin rather strongly denticulate; surface quite closely uniformly punctate throughout, the punctures separated by less than their own diameters; basal fovea round and moderately deep, but not large. Elytra oblong, sides nearly parallel but broadly rounded; striæ very faintly impressed, punctures moderate, finer apically. Prosternum coarsely, rather closely punctate; metasternum less coarsely, nearly uniformly punctate throughout, the

punctures slightly finer at the middle. Abdomen finely, sparsely punctulate toward the apex, less finely at base. Middle coxæ separated by nearly half the coxal width. Metasternum a little longer than the first ventral segment. Legs not stout. (Pl. V, fig. 48).

Male.—Front and middle tibiæ very feebly sinuate and mucronate within at the apex, hind tibiæ not visibly modified; fifth ventral segment a little longer than the fourth, with a distinct transverse apical impression occupying two-thirds the length of the segment.

Female.—Not seen.

Length 1.9 mm.

Hab.—South Carolina.

Very few specimens seen. It is probably nearest to *serrata* and *amplicollis;* from the first of these it may be distinguished by its stouter form and longer tempora, and from the latter by the thorax obviously widest in front of the middle and less nearly equal in width to the elytra.

C. cribricollis sp. nov.—Elongate, parallel, convex, rufotestaceous; pubescence grayish, moderate in length, recumbent. Head coarsely, closely punctate, eyes prominent, tempora rather short. Antennæ barely reaching the hind angles of the prothorax, joints 7 and 8 subglobular, 9 and 10 distinctly transverse. Prothorax distinctly wider than the head, but very slightly narrower than the elytra at the humeri; sides evenly rounded, widest very near the middle, base scarcely narrower than the apex, margin crenulato-denticulate; surface coarsely subcribrately punctate, basal fovea feebly impressed. Elytra parallel, sides feebly arcuate, apex obtusely rounded; striæ scarcely impressed, punctures moderately coarse toward the base; intervals more finely uniseriately punctate. Sterna coarsely, rather closely punctate; first ventral sparsely but distinctly punctate, following segments finely, sparsely punctulate. Middle coxæ separated by a trifle less than half the coxal width; metasternum a little longer than the first ventral. Legs moderate. (Pl. V, fig 49).

Male.—Front and middle tibiæ feebly sinuate and mucronate within at apex; fifth ventral transversely impressed at the apical margin.

Female.—Unknown.

Length 1.8–2 mm.

Hab.—Texas (Beeville). Two males taken by Mr. Schwarz in November.

The coarsely, closely punctate thorax is the most obvious distinguishing characteristic of this species, but there is a still more peculiar one which is quite likely sexual. The claws of the hind tarsi are much longer than the other feet, and the inner one exceeds the outer one in length and is straighter and sinuate at tip.

C. amplicollis sp. nov.—Elongate, subparallel, convex, rufotestaceous; pubescence moderate, recumbent. Details of form and sculpture substantially as described in *carolina*, except in the following respects: in *amplicollis* the eyes are a little larger, and the tempora a trifle longer, the tenth antennal joint is dis-

tinctly transverse; the thorax is scarcely at all cordate, the sides being nearly evenly rounded and widest at the middle; the basal fovea is less impressed; the elytra are also narrower; and the fifth ventral segment is less impressed at the apex. (Pl. V, fig. 50).

Male.—Front and middle tibiæ rather feebly sinuate and mucronate internally at apex; fifth ventral with slight transverse apical impression.

Female.—Unknown.

Length 1.9 mm.

Hab.—North Carolina. One male in the Horn collection.

C. serrata Payk.—Oblong-oval, moderately convex, rufotestaceous to rufopiceous, the elytra and corresponding lower surface often darker than the head and prothorax; pubescence grayish, recumbent. Head distinctly but not closely punctate; eyes moderately prominent; tempora very short. Antennæ scarcely reaching the hind angles of the prothorax, joints 9 and 10 subquadrate. Prothorax plainly wider than the head, three-fourths as wide as the elytra, transverse, subcordiform, sides rounded before the middle, moderately convergent behind; margin crenulato-denticulate, more strongly so posteriorly as usual; surface closely, moderately coarsely punctate throughout, the punctures separated as a rule by less than their own diameters; subbasal fovea rounded, moderately impressed. Elytra with the sides arcuately subparallel, rather broadly obtusely rounded at apex; striæ feebly impressed, punctures quite coarse toward the base, those of the interstaces finer. Pro- and mesosterna rugosely punctate; metasternum moderately closely and strongly punctate throughout, the punctures coarser laterally. First ventral distinctly but more sparsely punctate, the following segments finely and still more sparsely punctured. Middle coxæ separated by rather less than half the coxal width. Metasternum a little longer than the first ventral segment. Legs moderate. (Pl. V, fig. 51).

Male.—Front and middle tibiæ subsinuate and finely mucronate within at the apex; fifth ventral but little longer than the fourth, and with a small transverse apical impression.

Female.—Tibiæ simple; fifth ventral relatively longer and scarcely impressed.

Length 1.8–2.2 mm.

Hab.—A cosmopolitan species, of which I have seen specimens from Massachusetts, Pennsylvania, Illinois, Michigan, New Mexico and California.

Belon mentions Nebraska—doubtless on the supposition that Say's *octodentata* is a synonyn. Say's description is very brief and would fit tolerably well almost any *Corticaria*, and while the synonymy established is probably not very well founded, it has so long been accepted that it would best remain so without strong reasons for making a change.

In addition to one undoubtedly genuine example of *serrata* taken at Pasadena, I have in my collection specimens from So. California (Pomona and San Diego) which I have provisionally placed with *serrata*, though from certain small but apparently constant differences I strongly suspect they will prove to be distinct.

C. incerta sp. nov.—Oblong-elongate, rufotestaceous or brown; pubescence moderately long, grayish, recumbent. Head evenly, rather strongly, but not closely punctate; eyes moderate, tempora nearly one-third as long as the eye. Antennæ moderate, joints 9 and 10 slightly transverse. Prothorax feebly cordate, widest but little before the middle, the base but little narrower than the apex; side margin crenulato-denticulate; surface rather closely punctate, the punctures coarser, subrugose and close at the sides, but finer and separated by their own diameters at the middle; basal fovea round, moderately impressed. Elytra subparallel, sides broadly rounded; striæ very faintly impressed, the punctures rather coarse toward the base; interspaces more finely punctate. Sterna moderately closely, strongly punctate; abdomen finely, sparsely punctate, more distinctly on the first segment. Metasternum longer than the first ventral; middle coxæ distant but little less than half the coxal width. Legs moderate.

Male.—Front and middle tibiæ feebly sinuate and mucronate internally at the apex; fifth ventral scarcely visibly impressed.

Female.—Tibiæ simple; fifth ventral not at all impressed.

Length 2.1–2.3 mm.

Hab.—New Hampshire (Mt. Vernon—Blanchard); Lake Superior (Isle Royal—Hubbard and Schwarz).

A female from the former and a male from the latter locality are before me. Resembles *serricollis* most closely, but the non-foveate fifth ventral of the female at once separates it; the punctuation is also rather coarser and closer, and the prothorax is less narrowed behind. From *serrata*, which also bears a general likeness, it is distinguishable by its generally larger size, less close punctuation, much longer tempora and the scarcely evident impression of the fifth ventral in the male, which is here discal and in *serrata* apical.

C. apicalis sp. nov.—Oblong, subovate, convex, rufotestaceous, apical half of elytra piceous; pubescence pale, recumbent. Head rather densely, strongly punctate; eyes moderately prominent; tempora nearly one-third as long as the eyes, diverging posteriorly. Antennæ moderate, ninth joint about as long as wide, tenth a little transverse. Prothorax transverse, feebly cordate, widest slightly in advance of the middle, base a little narrower than the apex, side margins crenulato-denticulate; surface closely, moderately coarsely punctate throughout, the punctures a little less close at the middle, but everywhere less distant than their own diameters; basal fovea round and moderately deep. Elytra elongate-ovate, punctures rather coarse, those of the interspaces a little finer. Beneath moderately closely and coarsely punctate anteriorly, the punctures of the metasternum finer and sparser at the middle; first ventral sparsely but distinctly punctate, following segments more finely but not more sparsely punctate; surface of abdomen shining and polished at base, duller and finely alutaceous toward the apex. Metasternum longer than the first ventral segment; middle coxæ separated by one-half the coxal width. Legs moderate.

Male.—Unknown.

Female.—Tibiæ simple; fifth ventral plane.

Length 2 mm.

Hab.—Louisiana (Bayou Sara).

One example—in the Hubbard and Schwarz collection. If the coloration is constant there will be no difficulty in recognizing this species among any at present known. Uniformly colored examples, if such should occur, might easily be confused with *carolina*, *amplicollis* and especially with *serrata*. From all these the longer divergent tempora should distinguish it. The head is much more closely punctate than in *carolina*, and the prothorax is less ample than in *amplicollis*.

C. occidua sp. nov.—Elongate-oblong, feebly convex, brownish testaceous; pubescence flavo-cinereous, moderately long, recumbent. Head sparsely, finely punctate; tempora from one-fourth to one-fifth the length of the eyes. Antennæ nearly reaching the hind angles of the prothorax, the ninth joint about as long as wide, the tenth slightly transverse. Prothorax cordate, widest a short distance before the middle, moderately rounded and convergent behind, the base, however, not much narrower than the apex; margin rather strongly crenulato-denticulate; surface sparsely, finely punctate, the punctures of about the same size throughout, and everywhere distant from one to two times their own diameters; basal fovea round and moderately deep. Elytra elongate, sides parallel, feebly arcuate, striæ not distinctly impressed, punctures finer than usual. Beneath sparsely, finely punctate throughout, the punctures larger anteriorly as usual, and those at the sides of the metasternum a little coarser than at the middle, where they are as sparse and fine as on the first ventral segment. Metasternum distinctly longer than the first ventral segment; middle coxæ distant from one-third to one-half the coxal width. Legs moderate. (Pl. V, fig. 52).

Male.—Front and middle tibiæ distinctly sinuate and mucronate internally at apex; fifth ventral truncate and very vaguely sinuate at apex, surface slightly roughened and feebly transversely impressed in its apical half.

Female.—A specimen so referred has the tibiæ simple as is usual in this sex, the fifth ventral longer and rounded at the apex, without impression.

Length 2 2.1 mm.

Hab.—California (San Benardino Mts); Western Nevada (Horn collection); Arizona (Chiricahua Mts); Colorado (Veta Pass). The last two localities represented by specimens so referred in the Hubbard and Schwarz collection.

Two males in my collection, from the first-named locality, are to be regarded as the types. The other specimens, while probably specifically identical, differ slightly in density or coarseness of sculpture. The single specimen from Veta Pass is only 1.6 mm. in length. The types are decidedly more sparsely and finely punctate than in any of the previously described species.

C. dentigera Lec.—Elongate-oblong, moderately convex, usually piceous brown, with somewhat paler legs and antennæ; pubescence cinereous, recumbent. Head strongly, moderately closely punctate, tempora rather short, antennæ reaching the hind angles of the prothorax, the ninth and tenth joints barely or

scarcely as wide as long. Prothorax rotundate cordate, not much wider than long, about three-fifths as wide as the elytra; side margin crenulato-denticulate; surface rather closely and coarsely punctate; basal fovea moderately deep and nearly round. Elytra oblong, subovate, striæ faintly impressed, punctures moderate, finer on the interspaces. Sterna not closely punctate, rather finely and sparsely toward the middle of the metasternum; abdomen very finely and sparsely punctulate. Metasternum longer between the coxæ than the first ventral segment at sides; middle coxæ distant by about half the coxal width. Legs moderate. (Pl. V, fig. 53).

Male.—Front and middle tibiæ sinuate and mucronate within at tip; fifth ventral not impressed.

Female.—Tibiæ simple; fifth ventral with a very faint and vague median impression.

Length 1.7–2.1 mm.

Hab.—Lake Superior (type); Massachusetts (Lowell—Blanchard); Colorado (Garland—Schwarz; Leadville and Breckenridge, 9000–11000 ft.—Wickham); Washington. The very dark color, narrow thorax and nearly or quite unimpressed fifth ventral in both sexes, are the characters of especial service in identifying this species. It is evidently confined to the colder parts of our territory.

C. tenuipes sp. nov.—Elongate, depressed, pale rufotestaceous; pubescence pale, not conspicuous, recumbent. Head finely, feebly and sparsely punctate; eyes very large, separated on the front by barely twice their longest diameters as viewed from the front; tempora about one-fifth the length of the eye. Antennæ moderate in length, eighth joint subglobular, ninth and tenth a little transverse. Prothorax only slightly wider than the head, not very strongly transverse, widest just in front of the middle, base very slightly narrower than the apex, margin rather coarsely denticulate, surface finely, sparsely punctate and with a somewhat vague transverse basal impression. Elytra about one-half wider than the prothorax, sides parallel but broadly arcuate, apex obtusely rounded; striæ not impressed, punctures rather fine. Beneath finely, sparsely punctate, the abdomen minutely so. Metasternum longer than the first ventral segment; middle coxæ distant by one-half the coxal width. Legs very slender, the femora sublinear. (Pl. V, figs. 54, 54*a* and 54*b*).

Male.—Front and middle tibiæ just visibly sinuate within at tip, the mucro at the interior angle very small on the front, and scarcely visible on the middle tibiæ; fifth ventral fully one-half longer than the fourth, and rather strongly rounded at the apex; surface not impressed.

Female.—Unknown.

Length 1.7 mm.

Hab.—California (San Benardino Mts.). One example in my collection.

The small size, depressed form, pale color, large eyes, strongly denticulate thorax, which is scarcely wider than the head, and especially the very slender femora, are the chief characteristics of this very distinct species.

C. temporalis sp. nov.—Moderately elongate, feebly convex, rufotestaceous; pubescence pale, recumbent. Head finely but distinctly, rather sparsely punctate; eyes much smaller than usual, tempora nearly as long as the eye. Antennæ rather short, not reaching the hind angles of the prothorax, joints 7–10 as wide as long. Prothorax transverse, widest a little before the middle, sides moderately rounded anteriorly, a little sinuate before the hind angles, which are only slightly obtuse; base and apex subequal, margin finely serrulate; surface moderately punctate, the punctures distant by fully their own diameters; basal fovea somewhat transverse, distinct but not deep. Elytra two-thirds wider than the prothorax, striæ faintly impressed toward the base; punctures moderate, those of the interspaces finer, all finer toward the apex. Beneath sparsely, finely punctate throughout, the abdomen indistinctly so. Metasternum distinctly longer between the coxæ than the first ventral at sides; middle coxæ separated by barely two-fifths the coxal width. Legs rather slender. (Pl. V, figs. 55 and 55*a*).

Male.—Unknown.

Female.—Tibiæ straight; fifth ventral slightly longer than the fourth and unimpressed.

Length 1.4 mm.

Hab.—Texas (El Paso).

A single female taken by myself by sifting along the Rio Grande River. The small size, small eyes, and very long tempora are sufficient to separate it instantly from any other species known to me.

C. brevicornis sp. nov.—Elongate, depressed, rufotestaceous; pubescence of moderate length, recumbent. Head sparsely but distinctly punctate; eyes large, prominent, tempora about one-fifth as long as the eyes. Antennæ rather short, sixth joint subglobular, 7 and 8 a little transverse, 9 and 10 strongly transverse. Prothorax transverse, subcordate, moderately rounded in front, base a little narrower than the apex; surface moderately closely punctate, the punctures separated by about their own diameters at the middle, but rather closer at the sides; basal fovea moderately deep and a little transverse; margin crenato-denticulate. Elytra about one-third wider than the prothorax, oblong, parallel, sides feebly arcuate, apex obtusely rounded; punctures of striæ and interspaces moderate. Beneath sparsely, finely punctate, indistinctly so posteriorly. Metasternum longer than the first ventral; middle coxæ separated by more than half the coxal width. Legs rather slender. (Pl. V, figs. 56 and 56*a*).

Male.—All the tibiæ bent and mucronate within at tip, the posterior pair less distinctly so; fifth ventral usually not longer than the fourth and unimpressed, the sixth normally visible.

Female.—Tibiæ straight; fifth ventral but slightly longer than the fourth and unimpressed; sixth visible.

Length 1.6–1.75 mm.

Hab.—Massachusetts (Tyngsboro'—Blanchard); Michigan (Marquette); Florida (Tallahassee—Hubbard and Schwarz).

As indicated by the localities given this is a somewhat widely distributed species, but it is probable that it is confused with *elongata* in collections. The differences are numerous and are principally as

follows: In *brevicornis* the pubescence is shorter, the head wider and more strongly punctate, the tempora a little longer, the antennæ shorter, with the outer joints much more transverse, the pronotum less finely punctate, the prosternum longer before the coxæ, the femora more slender, the middle coxæ more widely separated, the posterior tibiæ feebly sinuate and mucronate in the male (not at all so in *elongata*), the fifth ventral much shorter. In *brevicornis* the sixth ventral is apparently normally visible in both sexes, but not at all so in the female of *elongata*, and sometimes not in the male.

C. elongata Gyll.—Elongate, parallel, depressed; pubescence pale, rather long, recumbent. Head scarcely more than two-thirds as wide as the prothorax; very lightly, finely, sparsely punctate; eyes moderately prominent; tempora short. Antennæ almost reaching the basal angles of the prothorax, the seventh joint slightly longer than wide, 8 subtransverse, 9 and 10 distinctly but not strongly transverse. Prothorax transversely quadrate, sides feebly rounded in front, and a little convergent behind; surface finely, sparsely punctate, basal fovea rounded and moderately deep; side margin finely crenulate in front and with a few more prominent denticles posteriorly. Elytra oblong, parallel, obtusely rounded at apex, finely seriately punctate, the intervals more finely so. Beneath finely punctate, the punctures closer and a little coarser anteriorly and toward the sides of the metasternum. Metasternum much longer at sides than the first ventral segment; middle coxæ separated by one-third the coxal width. Legs rather stout. (Pl. V, figs. 57 and 57*a*).

Male.—Front and middle tibiæ sinuate within near the apex, the inner apical angle mucronate; fifth ventral distinctly longer than the fourth, not impressed and moderately strongly rounded at apex.

Female.—Tibiæ straight; fifth ventral nearly as in the male.

Length 1.4–1.8 mm.

Hab.—Massachusetts; New York; Pennsylvania; Michigan; Iowa; California.

A common species which has become nearly or quite cosmopolitan. It need not be confused with any other species of our fauna except *brevicornis*, which see for a comparative statement.

C. ferruginea Marsh.—Oblong, moderately convex, ferruginous-brown, head often a little darker, pubescence very short, fine and appressed. Head with rather sparse and fine but moderately deep punctures; eyes moderately large; tempora very short; antennæ nearly or quite reaching the hind angles of the prothorax; the joints a little variable, but the seventh is usually just visibly longer than wide, the eighth subglobular, the ninth and tenth subquadrate or only very slightly transverse. Prothorax transversely subquadrate, widest before the middle, the base and apex subequal; sides broadly rounded in front, slightly convergent behind, margin feebly serrulate; surface rather sparsely and finely but quite strongly punctate; basal fovea rounded and usually well impressed. Elytra oblong-ovate, sides moderately arcuate; striæ scarcely impressed, punctures fine; intervals very finely, sub-biseriately or irregularly punctulate,

all punctures much finer or nearly obliterated toward the apex, except those of the sutural series. Prosternum subimpunctate; metasternum sparsely punctate at sides, very finely and remotely toward the middle; abdomen very minutely and sparsely punctate. Metasternum at sides longer than the first ventral segment; middle coxæ separated by distinctly less than half the coxal width. Legs moderate. (Pl. V, figs. 58 and 58*a*).

Male.—Front and middle tibiæ subsinuate within at apex, the apical mucro indistinct; fifth ventral unimpressed.

Female.—Tibiæ straight; fifth ventral not impressed.

Length 1.5-1.8 mm.

Hab.—Apparently occurs in every part of our territory, as will be seen from the following localities, which are represented in the material before me: Massachusetts; Pennsylvania; District of Columbia; Virginia; South Carolina; Florida; Michigan; Iowa; Colorado; Montana; Southern California; Oregon; Washington; British Columbia; Alaska.

In the ample series before me there is very little variation worthy of notice, except in one particular. The prothorax is larger, and especially wider in some examples, especially from the northwest; but there are intermediates in this respect, and there appears to be no good reason for attempting a division.

Unrecognized Species.

Canaliculata Mann. Alaska (Kenai).

Debilis Mots. Pennsylvania. The description indicates a species that is very close to, and probably not distinct from, *serrata*.

Depressiuscula Mots. Northern States of North America. Perhaps not different from *elongata*

Ferruginosa Mots. Georgia. Identical with *ferruginea?*

Striatopunctata Mots. Pennsylvania.

Spinulosa Mann. Sitka.

MELANOPHTHALMA Mots.

This genus is far less homogeneous in its makeup than *Corticaria*, and is capable of division into several tolerably well defined groups, which may be regarded of generic or subgeneric rank, according to the bias of the individual. Notwithstanding the very different appearance of the extremes of the series, these groups form a natural sequence, and the differences are, for the most part, those of degree rather than of kind. I have, therefore, preferred to adopt the lower estimate of their significance, the more so since this course is in harmony with that pursued by the ablest European

authorities in this family, viz.: Messrs. Belon and Reitter. There is one particular, however, in which I have felt compelled to differ with them. The genus *Cortilena* Mots., though not rigorously limited by its author, may be fairly considered to be represented by the European *fuscipennis* and our *picta* and *simplex*, species in which the most striking characteristic is the 2-jointed antennal club. Belon suppresses Motschulsky's genus as a synonym pure and simple, nor does he recognize in *fuscipennis* the type of a distinct group, but places it with the true *Melanophthalma*. In my judgment *fuscipennis*, *picta*, etc., are quite as sharply differentiated and therefore as worthy of a distinctive name as any of the subgenera admitted by the European authors; and while the careless use of the name proposed by the Russian author somewhat weakens its claim to recognition, it is still an available name, and having been used in this connection is preferable to a new one.

The three subgenera represented in our fauna may be defined as follows; a fourth—*Bicava* Bel.—is confined to New Zealand and New Caledonia.

Antennal club 2-jointed; intercoxal lamina of prosternum wider, distinctly visible throughout, the coxæ not contiguous on their free inner faces; abdomen of ♂ apparently composed of five segments, a small sixth segment usually visible in the ♀; first ventral segment with impressed lines extending obliquely back from the inner margins of the coxæ; intercoxal process of the abdomen truncate or feebly arcuate in front, the contiguous margin of the metasternum not incised at the middle; first two tarsal joints subequal; tempora well developed; prothorax angulate or subangulate at sides; pubescence short, much inclined and inconspicuous.....Subgenus **Cortilena.**

Antennal club 3-jointed; abdomen with a sixth segment more or less distinctly visible in both sexes; pubescence longer and more conspicuous.

Second tarsal joint as long as or slightly longer than the first; prothorax angulate at sides; intercoxal lamina narrow but visible between the front coxæ; first ventral with impressed lines; intercoxal process of first ventral more narrowly truncate at tip, the contiguous margin of the metasternum minutely incised at the middle, the incision deeper than wide, with the sides parallel or a little divergent anteriorly and rounded at the apex; eyes very large; tempora short but distinct; front tibiæ of ♂ not dentate.....Subgenus **Melanophthalma.**

Second tarsal joint much shorter than the first; prothorax not angulate at sides; intercoxal lamina very narrow, usually not distinctly visible, the coxæ contiguous or subcontiguous on their free inner faces; first ventral without impressed lines, its intercoxal process broad and truncate, the contiguous margin of the metasternum not incised; eyes smaller; tempora almost wanting; front tibiæ of ♂ dentate beyond the middle of the postero-interior margin..Subgenus **Corticarina.**

The determination of the number of ventral segments is often a matter of some difficulty, the sixth being at times nearly concealed by the denser pubescence of the abdominal apex; *gibbosa* seems to be a notable exception to the general rule in that the sixth segment, while normally exposed in the male, is rarely at all visible in the female. In other respects the characters named above seem very constant in our fauna, unless *transversalis* is included. This species was alluded to some twenty years ago by Reitter as being common in North America, but as no such reference is made by Belon in his recent catalogue, and as I have seen no specimen in the very large native material examined, it is probable that Reitter was in error. In *transversalis* the first tarsal joint is a little longer than the second, and the prothorax is scarcely angulate at sides; it is thus, in some degree, intermediate between *Melanophthalma* and *Corticarina*, but the balance of its affinities require that it be placed with the former. It will be included in the following table for convenience. The pubescence has been said to be less conspicuous in *Cortilena* than in the other subgenera. This is quite true in a general sense, but there is a distant gradation from *chamaeropis* and *picta*, where it is exceedingly fine and indistinct, through *casta* and *simplex* to the European *fuscipennis*, in which it is nearly as well developed as in *Corticarina*. In *Melanophthalma* proper—*villosa, distinguenda*, etc.—it reaches its greatest development.

The relative lengths of the tarsal joints is very constant and characteristic throughout the first two subgenera. When compared with the species with broad thoraces (*terricula* et seq.) in the third subgenus, the tarsal differences would seem to be generic; but the same constancy does not prevail in *Corticarina*, the species standing at the head of the subgenus (*gibbosa, incompta*, etc.), being distinctly intermediate in this particular. The attachment of the second joint shows an interesting gradation which is intimately connected with that just mentioned. In the species of *Cortilena* and *Melanophthalma*, the apex of the first joint is slightly oblique, but the articulation with the following joint is strictly terminal, and the first joint does not appreciably extend beneath the second. In *gibbosa, incompta*, and more evidently in *similata*, the first joint is more oblique at apex and extends a little way beneath the second; while in the species following, the second joint is inserted in a groove on the upper face of the first joint, which extends beneath it nearly to its apex in such manner that it is in great part concealed from beneath.

These gradations well illustrate the difficulties attending any attempt to establish groups of full generic value.

The following table contains all the species of the genus that I am able to define:

Antennal club 2-jointed; first and second joints of tarsi subequal.

Subgenus **Cortilena.**

Form narrower, parallel, head subequal in width to the prothorax; punctures of elytral striæ coarse, but shallow and somewhat vague, those of the interspaces scarcely visibly; color pale testaceous, the scutellum and also a median and subapical spot on each elytron black or blackish. **chamæropis.**

Form stouter and less parallel; head evidently narrower than the prothorax: punctures of elytral striæ fine, those of the intervals smaller but distinct.

Color flavo- to rufotestaceous; elytra with a transverse median fascia, and often a basal and apical cloud piceous; varies with the dark markings almost entirely lacking, or they may become suffused, leaving only two paler spots on each elytron..... **picta.**

Color pale yellowish testaceous throughout; the prothorax shorter than in *picta*..... **casta.**

Color ferruginous or rufotestaceous, the elytra darker, usually fuscous or brownish in mature specimens; form more elongate..... **simplex.**

Antennal club 3-jointed.

Second joint of tarsi as long as or slightly longer than the first: apex of front tibiæ in the ♂ provided with a longer, denser and more bristling fringe of hairs..... Subgenus **Melanophthalma.**

Claw joint of anterior tarsi toothed beneath in the ♂. Apices of elytra not sinuate or serrulate before the sutural angles, which are not at all produced.

Eyes smaller, separated on the front by about twice their longest diameter; tempora nearly one-third the length of the eye..... **insularis.**

Eyes much larger, separated on the front by less than one and one-half times their diameter, tempora scarcely ever exceeding one-sixth the length of the eye.

Elytra more oval, punctuation stronger, pubescence longer and less inclined, color variable, but with the elytra nearly always darker than the prothorax..... **distinguenda.**

Elytra more paralled and relatively narrower as compared with the prothorax; punctuation sparser, pubescence shorter and more inclined; color uniformly pale rufotestaceous..... **floridana.**

Claw joint of anterior tarsi not toothed beneath in the ♂.

Prosternum tumid before the coxæ, not armed with a spine at the tip in the ♂..... **pumila.**

Prosternum not tumid before the coxæ, and bearing at the middle of the posterior margin an erect acute spine in the ♂; color always pale yellowish testaceous, size small..... **aculifera.**

Second joint of tarsi but little shorter than the first; first ventral segment with a fine impressed line running obliquely backward from the inner margin of each coxa; front tibiæ and tarsi not toothed in the ♂.

transversalis.

Second joint of tarsi distinctly (usually much) shorter than the first; first ventral without impressed lines; front tibiæ of ♂ with a small acute tooth on inner side beyond the middle ...Subgenus **Corticarina.**

Prothorax of variable width, but always distinctly more than half as wide as the elytra; subbasal impression more or less transverse, usually confined to the disk, though at times more or less vaguely produced laterally; metasternal episterna impunctate or nearly so (except in *similata* and possibly *regularis*).....1.

Prothorax scarcely more than half as wide as the elytra, and with a moderately deep subbasal transverse impression extending nearly from side to side; metasternal episterna punctate.

Color brown; pubescence shorter, appressed; sides of thorax feebly rounded and scarcely serrulate.....**gibbosa.**

Color testaceous; pubescence long and bristling; sides of thorax rounded and rather strongly serrulate.....**incompta.**

1. Prothorax less transverse and less rounded on the sides, base narrower than the base of the elytra, the humeri rather broadly exposed (see Pl. V, fig. 68).

Elytra regularly subovate, their apices scarcely or feebly truncate.

Size smaller—never more than 1.5 mm., usually about 1.25 mm.—prothorax but little more than half as wide as the elytra.....**similata.**

Size larger—always exceeding 1.5 mm.

Prothorax but little more than half as wide as the elytra; the subbasal fovea feeble and produced laterally; second joint of hind tarsi a little shorter than the first.....**regularis.**

Prothorax wider; subbasal fovea deeper, but not distinctly produced laterally; second joint of hind tarsi much shorter than the first.

terricula.

Elytra arcuate at the sides anteriorly, thence convergent and nearly straight almost to the apices, which are more evidently truncate...**alberta.**

Prothorax more transverse and more strongly rounded at sides, base nearly as wide as the contiguous base of the elytra, the humeri but little exposed (see Pl. V, figs. 69, etc).

Sides of elytra nearly straight posteriorly, their apices distinctly truncate; color pale testaceous; last two ventral segments in the ♀ obliquely ascending, their sutures more or less evidently arcuate.

longipennis.

Sides of elytra arcuate throughout, their apices feebly or scarcely truncate; ventral segments of ♀ on same plane, sutures straight.....2.

2. Tempora very short; outer joints of antennal funicle longer than wide, the sixth and seventh very distinctly so, the eighth occasionally subglobular.

Elytra less broadly ovate, widest at the middle, relatively longer and more obtuse at apex; size generally larger, color usually yellowish to reddish testaceous.....**americana.**

Elytra shorter and more broadly ovate; widest a little before the middle, at least in the ♂; size generally smaller, color usually fuscotestaceous, the prothorax often paler.....**cavicollis.**

Tempora long, outer joints of funicle transverse, or at least as wide as long. **tenella.**

M. chamæropis sp. nov.—Oblong, parallel, moderately convex, feebly shining, pubescence very fine and sparse, whitish in color. Color pale testaceous, scutellum and also a median and apical dot, or small spot on each elytron black or brownish black. There is also usually between these spots a more or less obvious paler brown sutural spot or shade of variable shape, and the mesosternum and side pieces of the metasternum are brownish. Head subequal in width to the prothorax; eyes large and prominent; tempora well developed, rounded posteriorly; front scarcely one-half wider than the longest diameter of the eye, sparingly scarcely visibly punctulate. Antennæ about reaching the hind angles of the prothorax, club 2-jointed, all joints longer than wide, except the tenth, which is as wide as long. Prothorax transverse, sides angulate at the middle, straight and moderately convergent anteriorly, concave posteriorly, hind angles nearly right; margin not at all denticulate; surface dull and subimpunctate, without antescutellar fovea, but with sides broadly transversely impressed posteriorly. Elytra nearly one-half wider than the prothorax, not quite twice as wide as long, sides parallel, apex not at all truncate, sutural angles rounded; strial punctures large, but feebly impressed and vague, especially laterally; intervals scarcely visibly punctate. Beneath subimpunctate. Front coxæ separated by about two-fifths the coxal width, middle coxæ separated by their own diameters. Metasternum not sulcate posteriorly; intercoxal process of the first ventral truncate; first ventral with an oblique impressed line running backward and outward from the inner margin of each coxa. Legs rather slender. (Pl. V, figs. 61 and 61*a*).

Male.—Abdomen with five visible segments; fringe of hairs at tip of front tibiæ a little longer than in the female.

Female.—Abdomen with six segments.

Length 1.1—1.3 mm.

Hab.—Florida (Lake Poinsett; Haw Creek; Biscayne).

This very interesting species is one of the numerous discoveries of the late Henry G. Hubbard. It lives exclusively—so Mr. Schwarz writes me—in the half-dried fans of the Florida Palmetto.

At first glance the general facies of *chamæropis* is so different from typical *Melanophthalma* as to suggest the necessity for a new genus for its reception; but a search for structural characters to support this view reveals the fact that aside from its more parallel form, the differences between it and the other members of the subgenus *Cortilena* are entirely of a superficial nature. The front coxæ are here more widely separated than in any other species of the Corticariini.

M. picta Lec.—Oval, moderately robust, color flavo- to rufotestaceous, elytra with a transverse median shade, and usually a basal and apical cloud, fuscous; or by suffusion the elytra may become fuscous, each marked with an anterior

and posterior pale spot; pubescence whitish, very fine, short and indistinct. Head very finely sparsely punctulate; tempora distinct, parallel; antennæ as usual in the subgenus. Prothorax a little wider than the head, subquadrate, a little angulate at sides when viewed from above; sides straight and a little convergent in front of the angulation, slightly concave posteriorly; surface very finely reticulate, sparsely, finely but distinctly punctate; without basal fovea, the sides lightly transversely impressed posteriorly. Elytra one-half wider than the prothorax, rather short, ovate, sides arcuate; striæ not impressed, the punctures fine but distinct, and rather widely spaced; punctures of intervals very fine. Prosternum in front, and metasternum at sides sparingly punctate. Front coxæ distinctly but narrowly separated; middle coxæ distinct by fully two-thirds the coxal width. Legs moderate. Length 1.25 mm.

Hab.—Massachusetts; Pennsylvania; Maryland; Ohio; Illinois; Iowa; Missouri; Colorado (Greeley); Texas (Houston and Brownsville); Florida.

The sexual characters are those common to the subgenus, consisting of the longer and denser fringe of hairs at the apex of the front tibiæ in the ♂, and the presence of a small sixth ventral segment in the ♀.

The Florida specimens constitute apparently a well-defined race. In these the elytra are always (so far as I have seen specimens) blackish brown, each with two pale spots; the eyes are larger and the tempora correspondingly shorter than in northern specimens, or, indeed, than those from any other locality. In the northern and western specimens the prevailing color is pale, the basal and apical shades being frequently wanting; the eyes do not exceed, in their longest diameter, one-half the width of the front, and the tempora are in length about equal to one-third the length of the eye. There are apparently some other faint differences in minor details, but these I have not worked out. One specimen from Florida shows the color of the southern race, but the cephalic characters of the typical form; it therefore seems unsafe at present to do more than allude to the differences noticed. A very few specimens have been seen in which the elytral markings are entirely wanting; these closely resemble *casta*, but may be distinguished, should they occur in the same territory—which is unlikely, by the characters mentioned below.

M. casta sp. nov.—Form nearly as in *picta*; color entirely yellowish testaceous, the outer joints of antennæ sometimes a little darker. Very similar to *picta* in all respect, sexcept as follows: The pubescence is fine and short, but distinctly better developed; the head is more strongly and less sparsely punctate; the prothorax is more transverse and shorter relative to the length of the elytra; the punctures of the elytral intervals are more nearly equal to those of the striæ. (Pl. V, fig. 59). Length 1.2–1.5 mm.

Hab.—California (Redondo; Pomona; Pasadena).

M. simplex Lec.—Closely allied to *picta* and *casta*, but differing from both in coloration, the body being rufous or rufotestaceous throughout, with the exception of the elytra, which are uniformly of a darker shade, the depth of color varying with the maturity of the specimens, and to some extent individually. The elytra are also distinctly more elongate and more parallel, and the eyes larger than in either of the two species just named. The punctuation of the head is very minute, agreeing nearly with *picta*, while the small disparity in the size of the punctures of the elytral striæ and intervals, also the more obvious pubescence, allies it more closely with *casta*. Further description would be scarcely more than a repetition of the details given under *picta*.

Hab.—Maryland; Georgia; Florida (Tampa); Alabama; Texas (Columbus and Brownsville); Arizona; California (Yuma, Pasadena, Pomona, etc.).

Simplex is thus seen to be distributed from the Atlantic to the Pacific in the southern parts of our territory. An examination of Zimmerman's type shows that *subimpressa* is a synonym of *simplex* rather than of *similata* as stated by the European authors. There is no doubt, whatever, that *nigripennis* Mots. must be similarly disposed of.

M. villosa Zimm.—Elongate-oval, moderately convex, rufotestaceous; the elytra sometimes, or more commonly only the sutures, a little darker; pubescence long and conspicuous, the hairs arising from the elytral intervals usually a little more erect than those of the striæ. Head rather strongly and not very sparsely punctate; eyes large, apparently a little variable in size, but usually separated by nearly twice their longest diameter; tempora distinct, parallel, and in length about equal to one-fourth or one-fifth the length of the eye. Antennæ a little shorter than the head and prothorax; first joint large, subglobular; second much smaller, elongate-oval; third to eighth narrower, subcylindrical, gradually decreasing in length, but all longer than wide; club 3-jointed, the joints increasing a little in width; the ninth obconic, longer than wide; tenth obconic, about as wide as long; eleventh longer, obliquely truncate at apex. Prothorax transverse, sides angulate at middle, a little convergent and slightly concave posteriorly; more noticeably convergent and nearly straight in front; margin obsoletely crenulate, a moderately prominent denticle at the hind angles; surface rather strongly punctate, the punctures distributed a little irregularly, and distant from a little less to somewhat more than their own diameters; a moderately deep subbasal impression extending nearly from side to side. Elytra elongate-oval, apices a little sinuate and very minutely serrulate before the sutural angles, which are slightly produced; striæ not impressed, punctures moderate at base, finer posteriorly, those of the intervals somewhat finer, though not very conspicuously so as a rule. Prosternum in front, and sides of metasternum somewhat sparsely but strongly punctate. Abdomen finely, sparsely punctulate. Middle coxæ separated by usually distinctly less than half the coxal width. Legs moderate. (Pl. V, figs. 65 and 65*a*).

Male.—Front tibiæ with longer pubescence at apex; claw joint of front tarsi dentate beneath.

Female.—Front tibiæ and tarsi unmodified.
Length 1.6-1.9 mm.

Hab.—A widely diffused species, of which I have seen specimens from New Hampshire; Massachusetts; North Carolina; Iowa (Iowa City); Michigan (Grand Ledge); Utah (Utah Lake); Nevada (Reno); California (Lake Tahoe).

The form of the elytral apices offers the readiest means of recognizing this species; it is, however, decidedly larger than *distinguenda*—its closest ally—as is obvious when series are compared, the eyes are smaller and more widely separated, the middle coxæ are less distant, the color is usually paler, and the pubescence longer and more bristling.

M. insularis sp. nov.—This name is proposed for a form occurring on the Island of San Clemente (California), and differing from *distinguenda* in the relatively very small eyes and correspondingly long tempora. The latter are nearly one-third as long as the eye, or sensibly twice as long as in *distinguenda;* while the front is twice as wide as the longest diameter of the eye. While this may be only an extreme variation of *distinguenda*, the fact that I have seen nothing nearly approaching it in the character mentioned, has led me—though with some misgivings—to give it specific standing. The pubescence is shorter, and the elytral punctures coarser than in the average *distinguenda*, but specimens of the latter species have been seen that were not materially different in these respects.

Hab.—San Clemente Id.—Coast of So. California.

M. distinguenda Com.—Color varying from flavo- to fuscotestaceous, and either uniform throughout or with the elytra darker. Very much like *villosa* in all respects, except the following: The size is usually smaller; the eyes very large and separated on the front by much less than twice their longest diameter; the tempora are shorter; the eighth joint of antennæ is a little shorter and inclined to be subglobular; the prothorax is generally a little less closely punctate; the elytra not sinuate or serrulate at apex, the sutural angle not prolonged, but nearly right and narrowly rounded; middle coxæ separated by much more than half their own widths. Sexual characters are as in *villosa*. (Pl. V, figs. 62, 63 and 64). Length 1.1-1.8 mm.

Hab.—This cosmopolitan species occurs in every portion of our territory, and is nearly everywhere common.

The variations in size, color, sculpture and vestiture are quite considerable and have resulted in much synonymy. I have felt it necessary to add to the list of synonyms given by Belon in his recent catalogue, *helvola*, *inculta* and *inermis* of Motschulsky, and *rufula* Lec. While it can never be quite certain, without actual examination of types, that we have correctly assigned Motschulsky's species, the probabilities are great that such is the case in the present instance.

M. floridana sp. nov.—Closely allied to *distinguenda*, but believed to be distinct by a summation of small divergences from typical and ordinary forms of that species. One or another of most of the characters mentioned are approached in individuals of *distinguenda*, but their combination is peculiar and gives to *floridana* a facies of its own. The form is slightly but distinctly more parallel than in ordinary *distinguenda*; the elytra exceed the prothorax in width in a less degree; the color is a clear and uniform pale reddish testaceous, which I have never seen paralleled in *distinguenda*, in which, in a great majority of specimens, the elytra are more or less brownish and distinctly darker than the prothorax. Aside from the differences in punctuation and pubescence (mentioned in the table), which are not very marked, it may be said that the femora are a little less slender in *floridana*, and the tempora are nearly lacking; the latter being usually distinct, though short, in *distinguenda*. Length 1.4–1.5 mm.

Hab.—Florida (Tampa and Punta Gorda). Two pairs in the Hubbard and Schwarz collection. The species is probably confined to the peninsula.

M. pumila Lec.—Distinctly more parallel than *distinguenda*; nearly uniformly rufotestaceous throughout; pubescence rather long and bristling. The punctuation of the thorax and of the elytral striæ is somewhat coarser than is usual in *distinguenda*; the eyes are large, distant on the front by rather less than one and one-half times their longest diameters; tempora longer than in *distinguenda*; otherwise much as in the latter species, except as to the prosternum, which is transversely tumid before the coxæ, the elevation impressed somewhat at the middle, giving the appearance of an obtuse tubercle before each coxa, which, when viewed in profile, is nearly as prominent as the coxa. The last joint of the front tarsi is not dentate beneath in the ♂. Length 1.5—1.6 mm.

Hab.—New Hampshire; Massachusetts (Lowell); Michigan (Grand Ledge and Marquette); Ontario (Rosseau); British Columbia (Glacier). Collection of Blanchard, Hubbard and Schwarz and my own.

Specimens of so-called *pumila* received by Belon from the United States, have led him to consider this a synonym of *distinguenda*, while it is possible that they were really *pumila*, the distinctive characters of which were overlooked, it is much more probable that the specimens sent Belon were really the much more common *distinguenda*, since LeConte mixed the two species indiscriminately. It happens, however, that the specimen bearing LeConte's label, and which may, therefore, be considered the type, is the species here described.

M. aculifera sp. nov.—Our smallest species; color uniformly pale rufo- or flavotestaceous; pubescence long and bristling; punctuation of thorax coarser than usual; eyes large, tempora nearly obsolete; side margins of thorax quite strongly serrulate in some specimens. In the ♂ the prosternum behind the coxæ is armed with an erect, acute spine, which arises from the middle of the posterior

margin. The last joint of the front tarsi is not toothed beneath in the ♂. In this same sex I have noticed another singular character. The fifth (apparently) ventral segment is produced in a rounded lobe, which is polished, impunctate and closely fimbriate along the margin. The fifth and six ventrals are so closely united in the specimens before me, that the suture is difficult to make out, and I do not feel certain as to which the above structure pertains. A somewhat similar but less developed structure I think I have observed in males of *pumila*, but not elsewhere. It is, perhaps, significant that in these two species the front tarsi lack the tooth with which the claw joint is armed in the males of allied species. Length 1.2–1.4 mm.

Hab.—Florida—many localities in the southern half of the peninsula and in the Keys. Collected by Hubbard, Schwarz and Wickham.

M. gibbosa Herbst.—Oval, convex, usually piceous brown, but sometimes paler, antennæ and legs paler; pubescence moderate in length, rather closely recumbent. Head not very coarsely, but strongly and closely punctate, eyes moderately large and prominent, tempora subobsolete. Antennæ about reaching the hind angles of the prothorax; joints all longer than wide, except the tenth, which is as wide as long. Prothorax slightly wider than the head, and scarcely exceeding half the width of the elytra, very little wider than long; sides rounded a little anteriorly, thence feebly convergent and nearly straight to the hind angles, which are a little obtuse and not marked by a prominent denticle; margin scarcely, or very slightly crenulate; surface closely punctate and with an arcuate subbasal impression, which is usually moderately deep and reaches from side to side. Elytra oval, rather strongly punctate-striate, intervals somewhat more finely serially punctate. Prosternum punctate, especially along the front margin; metasternum as strongly but less closely punctate at sides, more remotely at middle, median line impressed in apical half; abdomen more finely and sparsely punctate. Middle coxæ separated by about two-thirds the apical width; hind coxæ widely separated, the intercoxal process truncate. Legs moderate. (Pl. V, fig. 66).

Male.—Anterior tibiæ a little arcuate, and armed on their postero-interior face with an acute tooth, which is situated at about the apical fourth; front trochanters finely denticulate; first joint of front tarsi a little dilated; sixth abdominal segment usually plainly visible, the fifth shorter and more truncate than in the female.

Female.—Tibiæ, tarsi and trochanters unmodified; sixth abdominal segment rarely at all visible, the fifth nearly as long as the two preceding together, and more narrowly rounded at the apex.

Length 1.1–1.5 mm.

Hab.—New Hampshire; Massachusetts; Michigan; West Virginia; British Columbia; Washington; Oregon; So. California.

A cosmopolitan species, which does not, however, as yet appear to have become established in the southern portions of our territory, except on the Pacific Coast. The densely punctate head, narrow subparallel thorax and sexual characters make its recognition exceptionally easy.

M. incompta sp. nov.—Short, broadly oval, convex, testaceous; pubescence long, more bristling on the elytral intervals. Head rather strongly, but less closely punctate than in *gibbosa;* eyes smaller, distant on the front by twice their own diameters; tempora very short, but distinct. Antennæ unusually long, passing the hind angles of the prothorax, the joints all longer than wide, the club loosely formed. Prothorax about one-third wider than the head, transverse, sides quite strongly rounded, and conspicuously serrulate; surface moderately punctate and with a distinct transverse basal impression, which reaches from side to side. Elytra nearly twice as wide as the prothorax, broadly oval, apices not truncate, moderately punctate-striate, intervals more finely seriately punctate as usual. Beneath sparsely punctulate; middle coxæ separated by about one-third the coxal width; legs moderate; last joint of hind tarsi longer than the two preceding together. (Pl. V, fig. 67). Length 1.1–1.3 mm.

Hab.—California (Pasadena—Fenyes).

Two females of this peculiar little species are before me. In general makeup it is allied to *gibbosa* and *similata*, and should stand between them. The pubescence is longer and more erect than in either, and it also differs from both in the last joint of the hind tarsi being distinctly longer than the two preceding united, and in the longer antennæ with less compact club. There are also other notable differences, as a comparison of the descriptions will show.

M. similata Gyll.—Oval, moderately convex, ferruginous brown to piceous, legs and antennæ paler, club of antennæ often darker; pubescence rather short, recumbent. Head distinctly narrower than the prothorax, sparsely obsoletely punctulate; eyes moderate, separated by rather more than twice their longest diameters; tempora nearly wanting. Antennæ scarcely reaching the hind angles of the prothorax, the eighth joint subglobular, tenth as wide as long. Prothorax a little wider than long, but little more than half as wide as the elytra; sides moderately rounded, very slightly more strongly so anteriorly; surface moderately closely and evenly punctate, a transverse median fovea, and a transverse lateral impression before the base, the latter more lightly impressed and sometimes indistinct; side margins feebly crenulate. Elytra not very broadly oval, a little obtuse or subtruncate at the apex; rather strongly punctate-striate, intervals a little convex and decidedly more finely punctate in series. Under surface lightly and sparsely punctate, the abdomen more finely as usual. Middle coxæ separated by a little more than half the coxal width. First ventral without impressed lines. Legs moderate. (Pl. V, fig. 68).

Male.—Front tibiæ with an acute tooth situated within and posteriorly at a point a little beyond the middle.

Female.—Front tibiæ unarmed.

Length 1.1–1.5 mm.

Hab.—Pacific Coast—from Vancouver to San Diego. It is common at San Francisco, and at Santa Monica and Redondo in So. California, but does not appear to go far from the sea coast.

This is the species to which LeConte gave the name *herbivagans*. I have sought assiduously, but without success, for some means of distinguishing it from the European *similata;* and I am confident

that if I were to mix a lot of our California species with a series of *similata* from Austria and Northern Mongolia received from Reitter, and then remove the labels, it would be impossible to again separate them.

Similata is known from various points in Siberia, and there is no doubt that its presence here is explainable in the same manner as that of numerous other species common to Siberia and the Northern Pacific coast region of this Continent. Belon cites no North American localities for this species, but gives Colombia in South America. *Subimpressa* Zimm. is not a synonym of *similata* as stated in our check list, but of *simplex*, as has been stated under that species

I have, though not with extire confidence, placed *lævis* Lec. in synonymy; the only difference noted, on a brief examination of the type, being that of color (pale testaceous); a further study would be desirable, but is not now possible *Lævis* was described from Yuma.

M. regularis Lec.—Brown, legs and basal joints of antennæ pale. Head narrower than the thorax, faintly sparsely punctulate; tempora short, yet distinct. Prothorax a little wider in front of middle, sides feebly rounded and a very little convergent posteriorly; sides with the usual tooth at the basal angles, but less prominent than in *americana;* punctuation moderately close and even, basal fovea somewhat vague and extending laterally to form a transverse depression. Elytra rather large, somewhat truncate at apex, nearly twice as wide as the prothorax; striæ unusually strongly impressed; punctures of intervals very fine, those of the striæ quite coarse. Legs rather slender; second joint of hind tarsi but little shorter than the first. Length 1.6 mm.

Hab.—New Jersey.

The above short description was taken from the LeConte type a year ago, and in the light of later experience another examination would possibly show it to be identical with the preceding species; the size is a little larger, however, and there are some other small differences in the descriptions.

M. terricula sp. nov.—Elongate-oval, convex, brown, legs and antennæ—except the outer joints—testaceous; pubescence short, recumbent. Head three-fourths as wide as the prothorax, punctate; eyes moderate, tempora subobsolete; antennæ not quite as long as the head and prothorax, all joints longer than wide. Prothorax transverse, about three-fifths as wide as the elytra, sides nearly evenly and not very strongly rounded; margin obsoletely crenulate, hind angles marked by a moderately prominent denticle; surface distinctly punctate, the punctures separated by about their own diameters, a little less close at the middle of the disk; a moderately deep fovea before the middle of the base, and a broader feeble impression each side before the hind angles. Elytra moderately strongly punctate-striate, the punctures of the intervals much finer. Abdomen very finely, sparsely punctulate; a few coarser punctures at the sides of the metasternum and along the front and side margins of the prosternum. Middle coxæ separated by three-fifths the coxal width. Sixth abdominal segment subequal in

length to the fifth in both sexes. Legs rather slender, the front femora somewhat stouter, as is usual in this part of the genus.

Male.—Front tibiæ with an acute tooth just beyond the middle.

Female.—Front tibiæ not toothed.

Length 1.5-1.7 mm.

Hab.—Wyoming (National Park). A short series taken by Hubbard and Schwarz.

M. alberta sp. nov.—Moderately elongate-oval, rufotestaceous, the outer joints of antennæ, elytral suture, metasternum and last joint of tarsi more or less darker or infuscate; pubescence moderate, subrecumbent. Antennæ barely reaching the hind angles of the pronotum, proportioned much as usual, joints 8 and 10 slightly longer than wide, all other distinctly so. Head sparsely punctate; eyes moderately large, distant on the front by scarcely more than twice their longest diameter; tempora short but distinct. Prothorax a little wider than the head, and about three-fifths as wide as the elytra; transverse, sides moderately rounded, slightly more strongly so anteriorly; indistinctly subcrenulate; hind angles marked by a not very conspicuous denticle; surface moderately punctate, distinctly foveate before the base. Elytra ovate, widest before the middle, thence nearly straight and convergent to just before the apex, humeri plainly exposed, apex distinctly truncate; striæ a little impressed and rather strongly punctate, intervals more finely punctate in series. Beneath sparsely, indistinctly punctate, the mesosternum and sides of metasternum more evidently so; metasternal episterna impunctate or nearly so. Metasternum distinctly longer between the coxæ than the post-coxal portion of the first ventral segment; middle coxæ separated by scarcely half the coxal width. Legs rather slender, but apparently a trifle stouter in the male.

Male.—Front tibiæ toothed as usual slightly beyond the middle.

Female.—Front tibiæ not toothed.

Length 1.7-1.8 mm.

Hab.—Alberta (Banff Springs). Six examples—collection of Hubbard and Schwarz.

In form of elytra this species approaches *longipennis*, though the peculiarity of form is here not so strongly marked. It differs by its narrower prothorax, its color, the longer metasternum and its normal ventral formation.

M. longipennis Lec.—Elongate-oval, uniformly pale yellowish testaceous; pubescence short, recumbent. Head sparsely, rather finely punctate, front more than twice as wide as the longest diameter of the eye; eyes prominent, but rather small, tempora short but evident; antennæ about as usual. Prothorax broad, more sparsely and finely punctate than in allied forms, basal fovea a little transverse and somewhat shallow; sides rather strongly rounded, margins scarcely visibly crenulate, hind angles with a prominent denticle. Elytra elongate, sides convergent and straight, or even a little sinuate posteriorly; apex broadly truncate. Metasternum shorter between the coxæ than the post-coxal length of the first ventral. Middle coxæ separated by less than half the coxal width. (Pl. V, fig. 69).

Male.—Front tibiæ dentate internally near the middle; abdomen projecting more noticeably beyond the elytra, ventral segments in one plane; femora stouter.

Female.—Front tibiæ not dentate; elytra more fully or quite covering the abdomen; last two ventral segments ascending; femora less stout.

Length 1.4–1.9 mm.

Hab.—Massachusetts—Cambridge, in salt marsh; Marblehead and Tyngsboro (Blanchard); Iowa—Iowa City (Wickham); Florida—Tampa (Hubbard and Schwarz).

This species is unique among those at present known by the ventral formation in the female. The peculiar form of the elytra, which, by the way, is also most marked in the female, is only approached by *alberta*.

M. americana Mann.—Similar to *cavicollis* in such matters of detail as are not mentioned in the table or below. The form is more elongate, the elytra widest at middle in both sexes, and longer relative to the thorax; the latter more transverse and more regularly rounded at the sides, with less deeply impressed fovea; the metasternum very distinctly longer than the post-coxal length of the first ventral. (Pl. V, figs. 70 and 72). Length 1.3–1.8 mm.

Hab.—Pennsylvania; District of Columbia; North Carolina; Illinois; Michigan; Canada (Toronto); Iowa; Dakota; Texas; Utah; New Mexico; Arizona; Nevada; California; Oregon; Vancouver Id.

Under the above name I have combined a mass of material from nearly every portion of our territory, which I have repeatedly worked over in the hope of laying hold of some constant and definable means of separating specifically. That the aggregate is composite is quite probable, but I can see no excuse for establishing species, or, for that matter, of perpetuating old names on so slender a basis that their subsequent recognition by students is a practical impossibility. The very limited material possessed by LeConte at the time of writing—more than forty years ago—gave no indication of the really unusual variability to which many species of this family are now known to be subject, and offered some excuse for describing as distinct a considerable number of salient forms, which are now seen to be so completely connected by intermediates that their recognition by description is impracticable and their validity questionable. The LeContean species, which, for the above reasons, I have for the present suppressed, are as follows:

Expansa.—This was described from San Diego and is the common coast form from So. Cal. to Vancouver. It does not differ appreciably from specimens from various parts of the East, though the color is generally paler, and the size larger than in specimens from the Atlantic district.

Scissa.—Based upon a robust female of pale yellow color, taken at Yuma. The punctuation of the thorax is a trifle closer than usual. I believe it to be at most nothing more than a local race.

Compta —Does not appear to be separable from small dark specimens of *expansa;* being indeed fairly intermediate between ordinary *expansa* and the Atlantic Coast form. The unique type is from San Diego.

Grata.—Described from a single male specimen from Lake Superior. This specimen is quite dark and a little more slender than usual, but neither the description nor an examination of the type yields anything further.

There are before me two or three other forms as worthy of names as the above, but like them, aside from some trifling variation in size and color, the differences seem to be almost confined to the outline and relative proportions of the elytra and prothorax.

What these variations may mean is a problem, the satisfactory solution of which will, I believe, severely test the acumen and patience of the future monographer. For the present it will be quite difficult enough in many individual cases to decide to which of the two species here recognized a given specimen may belong; small eastern males of *americana* and well-developed females of *cavicollis* being strikingly similar.

The names *americana* and *cavicollis* are used in the sense in which they were understood by LeConte and Horn, and it is probable that they had correctly interpreted Mannerheim. *Americana*, as here defined, in very widely dispersed. Specimens have not been seen from either the New England or Gulf States, but it is certain that it occurs in the latter region. In general its range is more southern and western, while that of *cavicollis* is northern and eastern.

M. cavicollis Mann.—Short, ovate, convex, color variable, but most commonly, when mature, with the head and prothorax rufotestaceous or ferruginous, the elytra darker—fuscotestaceous or brownish, body beneath darker, tip of abdomen paler, legs and antennæ testaceous, the outer joints of the latter darker. Pubescence rather short, recumbent. Head sparsely, finely punctulate; eyes rather small, prominent, separated on the front by more than twice their longest diameter; tempora very short but discernable. Antennæ nearly reaching the hind angles of the pronotum, all joints longer than wide, the tenth sometimes scarcely so. Prothorax transverse, subcordate, strongly rounded in front, straight posteriorly; the margin usually finely crenulate posteriorly, the hind angles marked by a prominent denticle; surface evenly punctate, the punctures rather fine and separated by from one to two times their own diameters; basal fovea deep, a little transverse. Elytra rather broadly ovate, base but slightly wider than the contiguous base of the prothorax, rather strongly expanded at the humeri, usually distinctly widest before the middle in the male, more nearly at the middle in the female; apices not truncate; striæ scarcely impressed, punctures moderate, those of the interspaces finer. Prosternum with a few vague punctures before the coxæ and along the front margin, and others more sharply impressed in the transverse fossæ and along the posterior margins at the sides.

Metasternum finely, sparsely punctate at the middle, a little less sparsely and finely at the sides; metasternal epimera with a few very fine and vaguely impressed punctures. Abdomen finely, sparsely punctulate. Middle coxæ separated by about half the coxal width; metasternum but very little longer between the coxæ than the post-coxal length of the first ventral. Sixth ventral segment very distinct and nearly as long as the fifth in both sexes. Legs moderate. (Pl. V, fig. 71).

Male.—Front tibiæ dentate in the usual manner just beyond the middle.

Female.—Tibiæ simple.

Length 1.1–1.5 mm.

Hab.—New Hampshire; Vermont; Massachusetts; Maryland; Michigan; Illinois; Colorado; Utah; Montana.

The points of difference between this species and *americana* have been sufficiently set forth in the table and in the remarks under the last named species. *Angularis* Lec. is founded on a small male from Lake Superior; with it, in the LeConte cabinet, is placed a similar male from Colorado. The specimens standing as *cavicollis*, in the same collection, are all females and of the usual form. This species seems to be essentially northern.

M. tenella Lec.—The long tempora and broad outer joints of the antennal funicle, as stated in the table, are probably sufficient for the recognition of this very peculiar and apparently rare species. The general facies is that of *cavicollis*, and the smaller examples of *americana*, and the possessor of material from middle California should see to it that he has not mixed *tenella* with the commoner species. *Tenella* differs from allied species in the prothorax being depressed posteriorly at the sides; the eyes seem rather smaller than usual, and the elytra at base are not at all wider than the contiguous base of the prothorax; the humeri less marked than in *americana*, if my memory serves me. I neglected to make a formal description of the two examples in the LeConte cabinet, contenting myself with noting the most salient distinctive marks. The length as given by LeConte is .04 inch.

Hab.—California (San José).

The two specimens in the LeConte collection are all that are known to me.

Unrecognized Species.

Cylindrinotata Mots. California.

Exigua Mann. Alaska (Kenai).

Helvola Mots. Pennsylvania.

Inculta Mots. Georgia (Atlanta).

Inermis Mots. New Orleans.

These last three species are probably only slight varities of *distinguenda*.

Orbicollis Mann. Alaska (Kenai).

Ovipennis Mots. Pennsylvania Probably equals *americana*.

Planiuscula Mots. Alabama (Mobile).

Pullula Mots. Alabama (Mobile).
Pusilla Mann. California.
Rectangula Mots. Louisiana (New Orleans).
Sericella Mots. Alabama (Mobile).

FUCHSINA gen. nov.

Labrum small, feebly dilated at sides; epistoma on the same plane as the front, and separated from it by a fine, distinct, feebly arcuate suture. Head broad; eyes wanting. Antennæ 10 jointed; club 3-jointed. Prothorax large, nearly as wide as the elytra; sides finely serrato-crenulate. Scutellum wanting, wings absent or rudimentary. Elytra slightly wider than the prothorax, oblong-oval, each with about twelve or thirteen subconfused rows of very fine punctures, from which proceed short fine appressed hairs. Front coxæ contiguous; middle coxæ rather narrowly but distinctly separated; hind coxæ not very widely distant, the intercoxal process of the first ventral broadly triangular, its apex rounded. Femora rather stout; first tarsal joint slightly longer than the second, the third subequal to the first two united. The abdomen appears to be made up of five segments; the tip of a sixth is, however, visible in one of the four specimens before me. The mouth parts are not distinctly visible, but appear to be substantially as in *Corticaria*.

In its 10 jointed antennæ *Fuchsina* agrees with the exotic *Migneauxia*, but in this latter genus the eyes, scutellum and elytral sculpture are normal, that is to say, substantially as in *Corticaria* and *Melanophthalma*.

F. occulta sp. nov.—Oblong-oval, rufotestaceous, moderately shining, with sparse, fine, short appressed pubescence proceeding from fine punctures on the pronotum, elytra and under surface. Head transverse; sides very slightly convergent from the nearly right basal angles to the frontal constriction; surface impunctate, minutely subalutaceous; eyes wanting; labrum but little larger than the epistoma, scarcely dilated at sides, feebly subsinuate in front. Antennæ 10-jointed, club abruptly 3-jointed; basal joint orbicular; second smaller, oval; 3–7 narrower, equal in width, the third nearly twice as long as wide, sixth and seventh subglobose; first two joints of club transverse, last joint a little longer than wide. Prothorax transverse, sides nearly evenly rounded, base and apex subequal, margin finely serrulato-crenulate, more distinctly so near the hind angles, which are sharply defined and slightly obtuse; surface rather sparsely and finely, but distinctly punctulate, with or without a faint subtransverse impression before the base. Scutellum wanting. Elytra but little wider than the prothorax, elongate-oval, widest very slightly before the middle, margin subexplanate toward the base, the humeral angles a little obtuse; each with about 12 or 13 unimpressed irregular rows of very fine punctures. Beneath sparsely, finely punctate, the metasternum more distinctly so. Prosternum long before the coxæ, and with a transverse lateral fossa as in *Corticaria*. Metasternun

between the coxæ subequal in length to the post-coxal length of the first ventral segment. First ventral at sides equal in length to the two following segments united. Front coxæ contiguous; middle coxæ separated by about one-third their own width. (Pl. V, figs. 73 and 73*a*). Length 1 1.15 mm.

Hab.—California, Los Angeles (Horn collection); Los Gatos (Hubbard and Schwarz); Mill Valley—Marin Co.

The single specimen in my collection was given me some years ago by Mr. Fuchs in company with certain other small things which he obtained by sifting earth and vegetable debris about the roots of redwoods a few miles north of San Francisco.

It gives me great pleasure to dedicate in his honor the genus erected for this the most extraordinary of our North American Corticariini.

In the bibliography which follows, I am much indebted to the recent catalogue of M. Belon; indeed, there has been little to do but to transcribe the record there given. I have omitted the European synonymy as being of little or no interest to the American student.

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C. serricollis Lec., Proc. Acad. Phil., 1855, p. 299.
C. poculifera sp. nov.
C. prionodera Lec., Proc. Acad. Phil., 1855, p. 300.
C. carolina sp. nov.
C. cribricollis sp. nov.
C. amplicollis sp. nov.
C. serrata Payk., Faun. Suec., i, p. 300.—Reitt., Stett. Ent. Zeit., 1875, p. 425.—Bel., Ann., Soc. Linn. Lyon, 1884, p. 62.
octodentata Say, Jour. Acad. Nat. Sci., iii, p. 325.
C. incerta sp. nov.
C. apicalis sp. nov.
C. dentigera Lec., Proc. Acad. Phil., 1855, p. 300.
C. tenuipes sp. nov.
C. temporalis sp. nov.
C. brevicornis sp. nov.
C. elongata Gyll., Ins. Suec., iv, p 130.—Reitt., Stett., Ent. Zeit., 1875, p. 429.—Bel., Ann. Soc. Linn. Lyon, 1884, p. 95.
C. ferruginea Marsh., Ent. Brit., i, p. 111.—Gyll., Ins. Suec., iv. p. 131.—Mann., Germ. Zeits., v, p. 45, n. 36.—Thom., Skand. Col., v, p. 234.
deleta Mann., Bull. Mosc., 1853, iii, p. 212.
denticulata Kirby, Fauna bor. Amer., p. 110.
kirbyi Lec., Proc. Acad. Phil., 1855, p. 300.
obtusa Lec., loc. cit., p. 300.
rugulosa Lec., loc. cit., p. 300.

Unrecognized Species.

C. canaliculata Mann., Bull. Mosc., 1853, ii, p. 211, n. 167.
C. debilis Mots., Bull. Mosc., 1867, i, p. 61.
C. depressiuscula Mots., loc. cit., p. 72.

C. ferruginosa Mots., loc. cit., p. 73.
C. spinulosa Mann., Bull. Mosc., 1852. ii, p. 361, n. 158.
C. striatopunctata Mots., Bull. Mosc., 1867, i, p. 56.

MELANOPHTHALMA Mots.

Subgenus *Cortilena* Mots.

M. chamæropis sp nov.
M. picta Lec., Proc. Acad. Phil., 1855, p. 303.—Bel., Ann. Soc. Ent. Belg., xxxix. 1895, p. 104.
M. casta sp. nov.
M. simplex Lec., Proc. Acad. Phil., 1855, p. 303.
nigripennis Mots., Bull. Mosc., 1867, i, p. 96.
subimpressa Zimm., Trans. Am. Ent. Soc., 1869, p. 256.

Subgenus *Melanophthalma* in sp.

M. villosa Zimm., Trans. Am. Ent. Soc., 1869, p. 256.
M. insularis sp. nov.
M. distinguenda Com., Col. Novoc, p. 38.—Reitt., Stett. Ent. Zeit., 1875, p. 438.—H. Bris., Ann. Soc. Ent. Fr., 1881, p. 409.—Bel., Ann. Soc. Linn. Lyon, 1884, p. 111.
pusilla Melsh. (non Mann.), Proc. Acad. Phil., 1844, p. 116.
morsa Lec., Proc. Acad. Phil., 1855, p. 302.
rufula Lec., loc. cit., p. 303.
subangulata Mots., Bull. Mosc., 1866, iii, p. 281.
M. floridana sp. nov.
M. pumila Lec., Proc. Acad. Phil., p. 302.
M. aculifera sp. nov.

Subgenus *Corticarina* Reitt.

M gibbosa Herbst., Käf., v, p. 5, pl. 44, fig. 2.—Reitt., Stett. Ent. Zeit., 1875, p. 433.—H. Bris., Ann. Soc. Ent. Fr., 1881, p. 406.—Bel., Ann. Soc. Linn. Lyon, 1884, p. 119.
M incompta sp. nov.
M. similata Gyll., Ins. Suec., iv, p. 134.—Reitt., Stett. Ent. Zeit., 1875, p. 440.—H. Bris., Ann. Soc. Ent. Fr., 1881, p. 407.—Bel., Ann. Soc. Linn. Lyon, 1884, p. 124.
herbivagans Lec., Proc. Acad. Phil., 1855, p. 302.
levis Lec., loc. cit., p. 302.
M. regularis Lec., Proc. Phil. Acad., 1855, p. 301.
M. terricula sp. nov.
M. alberta sp. nov.
M. longipennis Lec., Proc. Phil. Acad., 1855, p. 300.
M. americana Mann., Germ. Zeits., v, p. 50.
compta Lec., Proc. Acad. Phil., 1855, p. 301.
expansa Lec., loc. cit., p. 301.
grata Lec., loc. cit., p. 301.
scissa Lec., loc. cit., p. 301.
M. cervicollis Mann., Germ. Zeits., v, p. 57.
angularis Lec., Proc. Acad. Phil., 1855, p. 301.
M tenella Lec., loc. cit., p. 301.

Unrecognized Species.

M. pusilla Mann., Germ. Zeits., v, p. 48.
M. exiguua Mann., Bull. Mosc., 1853, iii, p. 212.
M. orbicollis Mann., loc. cit., p. 211.
M. helvola Mots., Bull. Mosc., 1866, iii, p. 275.
M. inculta Mots., loc. cit., p. 283.
M. inermis Mots., loc. cit., p. 283.
M. cylindrinotata Mots., loc. cit., p. 288.
M. rectangula Mots., Bull. Mosc., 1867, i, p. 87.
M. ovipennis Mots., loc. cit., p. 81.
M. pullula Mots., loc. cit., p. 89.
M. serricella Mots., loc. cit., p. 93.
M. planiuscula Mots., loc. cit., p. 94.

FUCHSINA gev. nov.

F. occulta sp. nov.

EXPLANATION OF PLATES.

PLATE III.

Fig. 1, 1*a*.—*Holoparamecus ragusæ.*
" 2, 2*a*.— " *singularis.*
" 3, 3*a*.— " *kunzei.*
" 4, 4*a*.— " *pacificus.*
" 5, 5*a*.—*Dasycerus carolinensis.*
" 6, 6*a*.—*Metophthalmus parviceps.*
" 7.— " *rudis.*
" 8.— " *trux.*
" 9.— " *albosignatus.*
" 10.—*Lathridius lardarius.*
" 11, 11*a*.— " *brevicavus.*
" 12.— " *armatulus;* 12*a* antenna; 12*b* front tibia of ♂; 12*c* front tibia of ♀.
" 13.— " *lituratus.*
" 14, 14*a*.—*Coninomus australicus.*
" 15.— " *constrictus,* antennal club.
" 16.—*Enicmus protensicollis.*
" 17.— " *suspectus.*
" 18.— " *desertus.*
" 19.— " *consimilis.*
" 20.— " *minutus.*

PLATE IV.

Fig. 21.—*Enicmus crenatus.*
" 22.— " *strenuus.*
" 23, 23*a*.—*Enicmus aterrimus.*
" 24.—*Enicmus fictus.*
" 25.— " *mendax.*
" 26.— " *ventralis.*
" 27.— " *cordatus.*
" 28, 28*a*.—*Enicmus tennicornis.*
" 29.—*Cartodere quadriforeolata.*
" 30.— " *ruficollis.*
" 31.— " *costulata.*
" 32.— " *filiformis.*
" 33.— " *argus.*

Fig. 34.—*Cartodere filum.*
" 35.— " *elegans.*
" 36.—*Adistemia watsoni.*
" 37, 37*a*, 37*b*.—*Belonia unicostata;* antenna and front leg, showing elongate trochanter.
" 38.—*Revelieria californica.*
" 39.—*Corticaria pubescens.*
" 40.— " *fulva.*
" 41.— " *parallela.*
" 42.— " *valida.*
" 43.— " *inopia.*

PLATE V.

Fig. 44.—*Corticaria plauula.*
" 45.— " *columbia.*
" 46.— " *serricollis.*
" 47.— " *poculifera.*
" 48.— " *carolina.*
" 49.— " *cribricollis.*
" 50.— " *amplicollis.*
" 51.— " *serrata.*
" 52.— " *occidua.*
" 53.— " *dentigera.*
" 54, 54*a*, 54*b*.—*Corticaria tenuipes;* head and femur.
" 55, 55*a*.— " *temporalis;* head and femur.
" 56, 56*a*.— " *brevicornis.*
" 57, 57*a*.— " *elongata.*
" 58, 58*a*.— " *ferruginea.*
" 59.—*Melanophthalma casta.*
" 60, 60*a*.— " *simplex.*
" 61, 61*a*.— " *chamæropis.*
" 62.— " *distinguenda.*
" 63.—Hind tarsus of *M. distinguenda*, etc., of subgenus *Melanophthalma.*
" 64.—Head of *M. distinguenda.*
" 65.— " *M. villosa.*
" 65*a*.—Apical angle of elytron—*M. villosa.*
" 66.—*Melanophthalma gibbosa.*
" 67.— " *incompta.*
" 68.— " *similata.*
" 69.— " *longipennis.*
" 70.— " *americana.*
" 71.— " *cavicollis* ♂.
" 72.—Hind tarsus of *M. americana* and allies.
" 73, 73*a*.—*Fuchsina occulta.*

ERRATA.

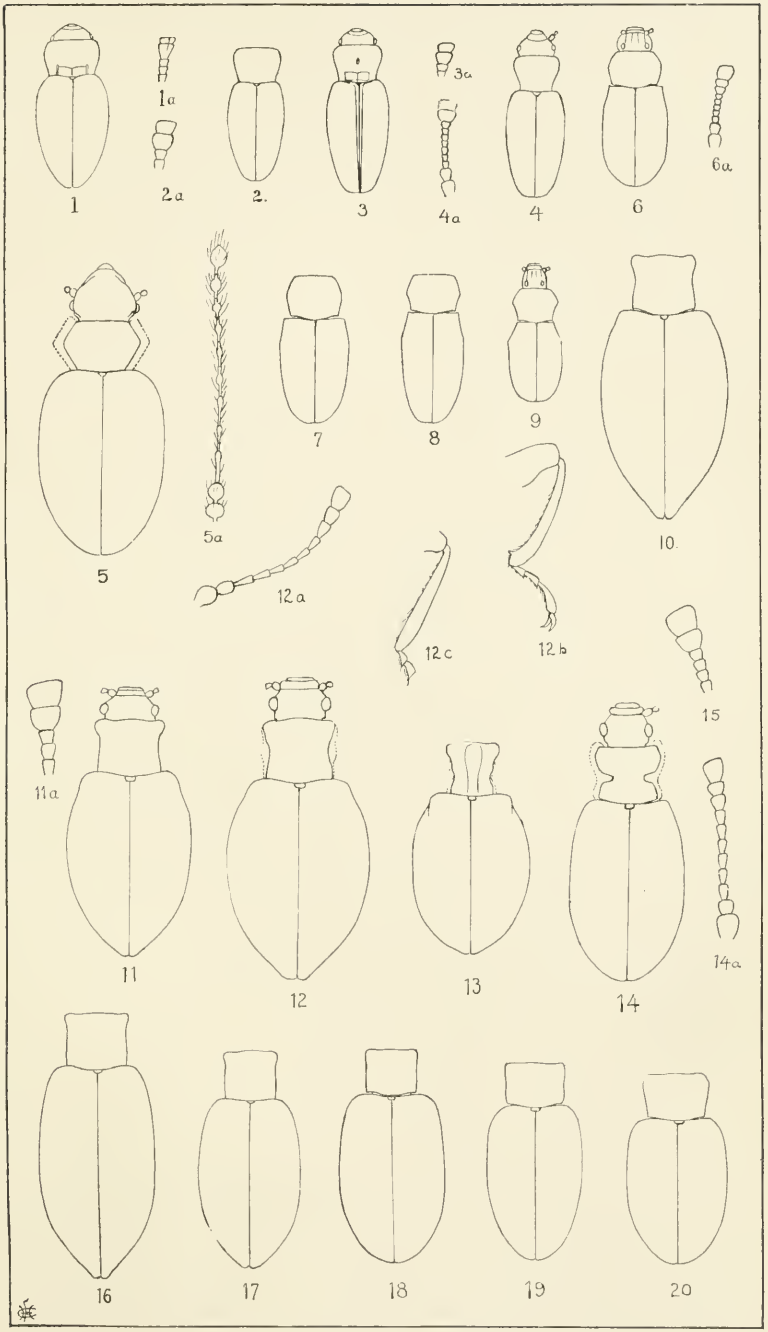
Page 130, line 6 from top, for assume *read* assure.
" 143, " 2 " bottom, for embrance *read* embrace.
" 168, " 19 " top, for distant *read* distinct.
" 169, " 18–20 from bottom, should read as follows:

Claw joint of anterior tarsus toothed beneath in the ♂.

Apices of elytra slightly but distinctly sinuate and minutely serrulate before the sutural angles, which are slightly produced . . . . . **villosa.**

Apices of elytra not sinuate or serrulate before the the sutural angles, which are not at all produced.

Page 172, line 11 from top, for distinct *read* distant.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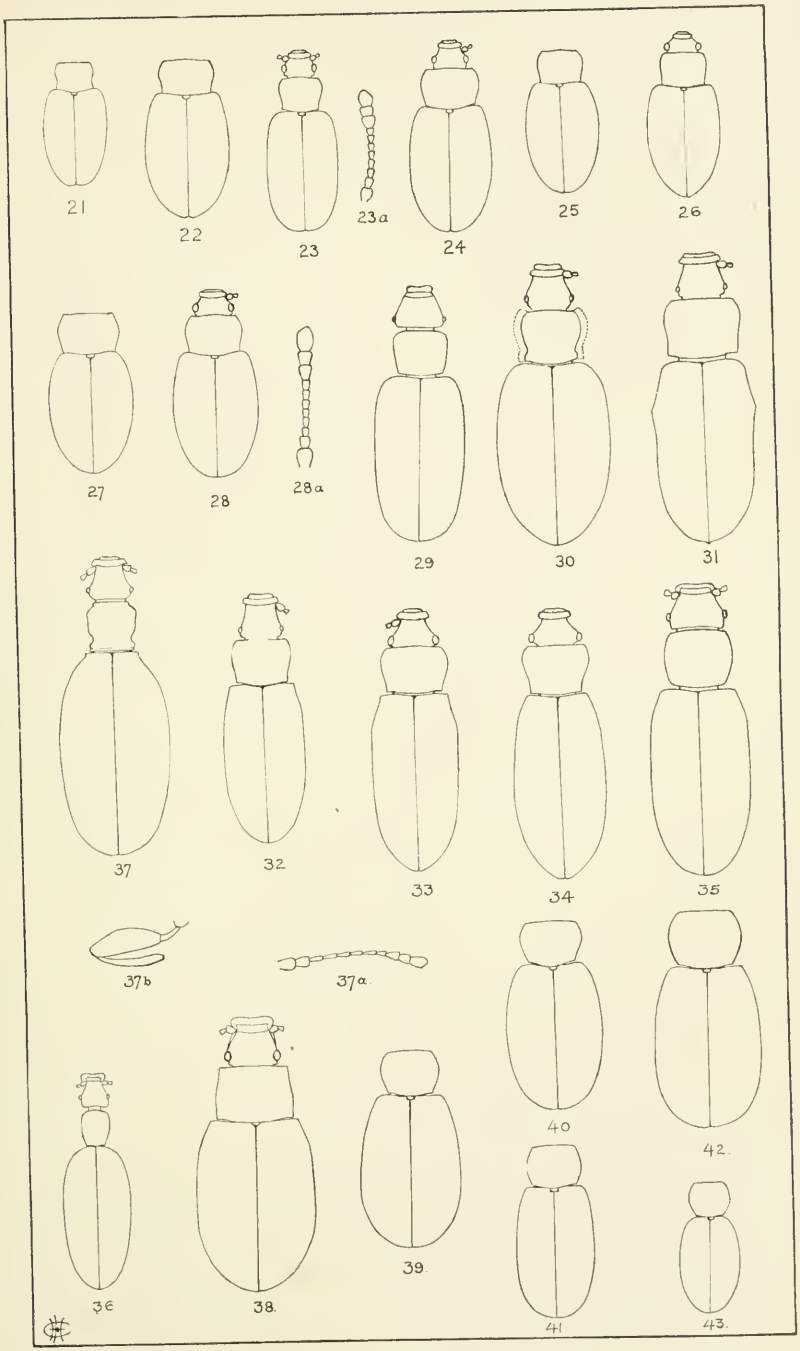
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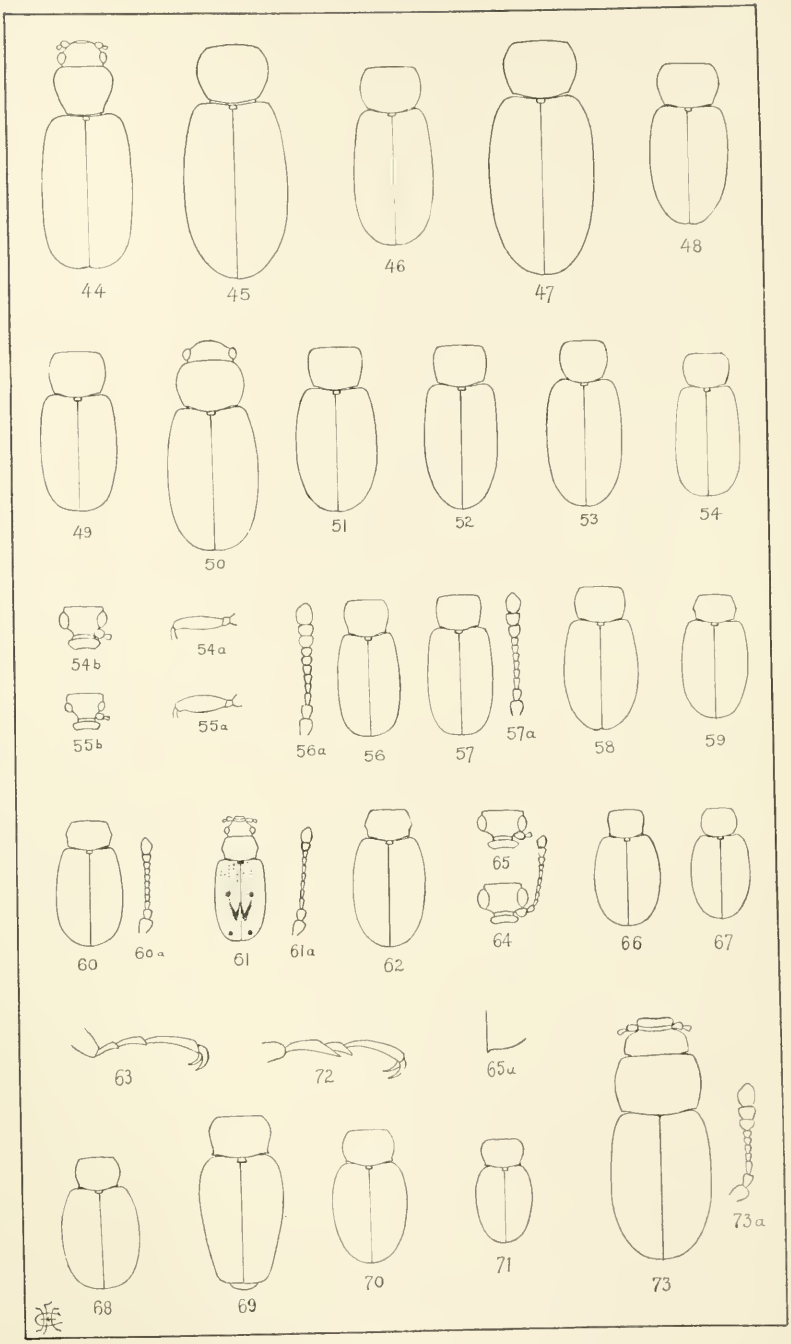
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A STUDY OF THE SPECIES OF TACHYS OF BOREAL AMERICA.

BY ROLAND HAYWARD.

Probably few, if any, genera of Carabidæ have received so little attention from collectors and students of our fauna as the one which forms the subject of the present essay. This is due in part to the small size of the species composing it, and also to the scattered and fragmentary condition of the literature of the subject.

The nearest approach to a monograph of our species that has ever been published is contained in Dr. LeConte's "Descriptive Catalogue of the Geodephagous Coleoptera Inhabiting the United States east of the Rocky Mts."* In a paper which appeared a few years later† the views therein expressed were further modified by that author, several new species described and the genus *Pericompsus* erected for the reception of *ephippiatus*, *sellatus* and *lætulus*. Since that time scarcely anything has been published in this country, with the exception of a few isolated descriptions of new species. With regard to the foreign works on the subject, there are two which require especial mention. The first of these, "De Bembidiis Europæis," was published by Jacquelin-Duval, in 1851.‡ *Tachys* is therein regarded as a group of *Bembidium*, but several characters are suggested in Duval's monograph which have been of service in the separation of our species. The second is by Motschultsky,|| and contains a subdivision of the genus into six genera, the characters on which they are based being of little or no value, as regards our species, even for the definition of groups. The work is so inaccessible to the majority of our students, however, that a reprint of the table of genera therein contained is published in the appendix, together with the original descriptions of the species described from North America, which I have as yet been unable to identify.

Some months after the publication of my paper on *Bembidium*, I undertook to arrange the species of *Tachys* in my own cabinet. This was done without any intention of publication, but it soon

* Ann. Lyc., 1848, iv, pp. 468–473.

† Ibid, 1851–2, v, pp. 191–194.

‡ Ann. Soc. Ent. France, 1851, sér. 2, ix.

|| Etudes Ent., 1862, xi, pp. 24–37.

became apparent that the task was by no means an easy one, and that a thorough study of types and comparison of specimens would be necessary before anything could be accomplished. The work has been a long one, and it has been thought best to publish the results, which are offered in the following paper with the hope that some assistance may be afforded thereby to those who may desire in the future to study these small, but interesting insects.

During my work upon this genus I have keenly felt the need of assistance and advice from one, now removed from us, who was ever ready with valuable aid and suggestions for those similarly engaged; a need that I fear will also be appreciated by those who use this paper. No one can realize more fully than I the irreparable loss which entomology has sustained by the death of Dr. George H. Horn.

I desire, however, to acknowledge the kind assistance that I have received in many ways from numerous friends and correspondents, which has added materially to whatever value my work may possess.

My warmest thanks are due to Mr. Samuel Henshaw, who, as heretofore, has rendered me valuable aid. To him I am indebted for a free use of the LeConte collection, for much assistance in bibliographical work and for kind advice.

Messrs. Frederick Blanchard, F. C. Bowditch, H. C. Fall and Charles Liebeck have kindly placed their entire material in my hands for many months, thereby largely increasing the amount that I have had for study, while Messrs. W. H. Harrington, L. E. Ricksecker, Henry Ulke, H. W. Wenzel, H. F. Wickham and Mrs. A. T. Slosson have aided me by the loan and gift of specimens. To all of these I would express my gratitude.

To the American Entomological Society I am under great obligations for the loan of the material formerly in Dr. Horn's cabinet, now a part of their collection; a service that has been of great value.

I would also express my gratitude to M. Rene Oberthür of Rennes, France, who has kindly loaned me the types of several of the species described by Baron Chaudoir.

To Mr. Theodore Pergande I am grateful for the determination of the hosts of several myrmecophilous species.

Lastly, I would express my thanks to my friend Mr. J. H. Emerton for the use of his facile pencil and the care that he has taken in the drawing of the figures.

The genus *Tachys* exhibits a considerable range of variation, several groups having at different times been elevated to the rank of genera. As elsewhere expressed with regard to *Bembidium*, it is my opinion that no satisfactory results can be obtained in generic subdivision until all the species of the genus, at least, shall have been studied, if not, indeed, all those of the tribe Bembidiini.

As here recognized, the genus includes all the members of that tribe in which the anterior tibiæ are obliquely truncate at apex, *Pericompsus*, which differs from *Tachys* only by the deep, entire marginal stria of the elytra, being regarded as a group of the latter genus.

Several other characters not seen in *Bembidium* may be mentioned, which, although not possessed by all the species, are observable in most of them.

Among these the sutural stria of the elytra in nearly all is deeper posteriorly and presents the appearance of being recurved at apex, the recurved portion being parallel either with the margin or with the suture, in the latter case often hooked at tip. This is due to the fact that the other dorsal striæ are usually feebly impressed and almost or entirely effaced at apex, what appears as the recurved portion of the sutural stria being in reality the remnant of the apical portion of the fifth, seventh or, in one group, probably the third stria. In those species in which the elytral striæ are more distinct and entire, or nearly so, this character is less marked, and in *æneseens* is entirely lost.

The scutellar stria of the elytra, which is present in at least all our North American species of *Bembidium*, is entirely absent in those of *Tachys*, and as Duval gives this as one of the distinguishing characters of his group XV, which is the equivalent of *Tachys*, it probably applies to the exotic species.

In most *Tachys* the second and third joints of the antennæ are subequal. Rarely, however, the second is longer than the third. In *Bembidium* the reverse is the case, though in a few species the third is but slightly longer than the second.

Most of the characters employed in the system here proposed have been long known and have become the common property of science, some are brought into greater prominence than heretofore in the grouping of species, while a few, so far as I am aware, are here suggested for the first time. No claim is made that the system will apply to the large number of exotic species that have been de-

scribed, but, so far as concerns our fauna, it gives a division into what appear to be natural groups, and it is hoped may serve until the tribe Bembidini shall have been studied in its entirety.

Before passing to the definition of our species, it may be well to briefly review the characters used in grouping them.

In nearly all, the head, although not narrowed to a neck, is free from the thorax for some distance behind the eyes. A single exception to this is seen in *œnescens*, in which it is inserted in the thorax to the eyes. This is shown on Plate VI, fig. 9.

The mentum varies in the different species, being more or less emarginate in front, with a tooth of varying prominence at the bottom of the emargination. In rather more than half our species there will be observed, behind the tooth, two large, foramenifonn punctures (Plate VI, fig. 13), which are entirely absent in the others (Plate VI, fig. 12). This character seems an important one. It is not difficult to detect, even with a moderately powerful hand-lens, and, as soon as recognized, its presence or absence can readily be determined even in our smallest species.

Several differences are observable in the palpi, especially in the comparative length of the small, subulate terminal joint, but I have been unable to make use of these.

The antennæ are subject to some variation. The second and third joints, as already stated, are subequal in the majority of our species. The second joint is, however, slightly shorter than the third in *nanus*, *falli* and *frontalis*, while in *scitulus* and several other species of the ninth group the reverse is the case. In *rufotestaceus* and *lævus* (Plate VI, fig. 14) the second is very distinctly longer than the third, and in the last named species the seven following joints are nearly equal and submoniliform, the eleventh being longer, and the antennæ resemble closely those of *Anillus*.

In nearly all the eyes are large or moderately large and prominent. In *ferrugineus*, however, they are comparatively small and somewhat flattened. This is also the case, to a less degree, in *mordax*.

The thorax affords few characters of use in the division of the genus into groups. It is usually transverse, subquadrate, with the base as wide or wider than the apex, or more rarely slightly narrower. The base is usually squarely truncate, sometimes more or less obliquely so each side. In the fourth group, which includes *tripunctatus*, *incurvus* and most of the more convex species, two series are observable, based upon the presence or absence of three

large punctures near the middle of the posterior transverse impression. This is represented on Plate VI, figs. 10 and 11.

Many characters of great importance are derived from the elytra. These are rounded at tip in all the groups, except that containing *œnescens*, in which the apex is subtruncate. The dorsal punctures are usually two in number and differ in position in the different groups. In *œnescens*, however, I have been able to detect but a single puncture, which is so small that it can be located only by the seta arising from it. The recurved portion of the sutural stria, to which allusion has already been made, also affords several useful characters. These differences are well represented in the figures (Pl. VI, figs. 1–8). The other dorsal striæ vary considerably, especially in number, but I am inclined to think that too much value has been assigned to this latter character by several authors. In most species they are impunctured, rarely distinctly punctate. The marginal stria is usually broadly interrupted at middle, rarely (*ephippiatus*, etc.) deep and entire, sometimes with the basal portion obsolete and represented by punctures, or even (*lævus*) completely effaced. In the latter case the marginal setigerous punctures, which are present in all our species near the humerus and apex, assume unusual prominence.

In nearly all our species the first two joints of the anterior tarsi are dilated in the males (Pl. VI, fig. 15), although less broadly than in *Bembidium*. In *corruscus* (Pl. VI, fig. 16) and several other species of the ninth group only the basal joint is dilated, while in *ephippiatus* and its allies and *œnescens* the tarsi are similar in the sexes. The males are usually rarer than the females.

All the species of *Tachys* are of small size, the largest (*sellatus*) being about .16 inch (4 mm.) long, while the smallest (*lævus*) measures only .05 inch (1.25 mm.) in length. Most of them are found in moist places, or are riparial in their habits. Some occur under bark, while a few are myrmecophilous. They are entirely unknown to me in their early stages, and, so far as I am aware, the larva and pupa of but a single species (*nanus*) have been described.*

The genus is represented on both sides of the continent, but the species are more numerous in the southern than in the northern portions of the country.

A few words are necessary with regard to the plate which accom-

* Perris, Hist. pin Mar. (1862), 1863, i, pp. 439–461, figs. 510–516.

panies this paper. The figures are in the main diagramatic, the minor details being omitted lest they might mislead the student. All have been drawn under high power, so that in those representing the elytra, which have all been drawn on the same scale, more striæ are shown in several cases, than appear when the specimen is magnified to a less degree.

In conclusion, I would ask a little indulgence of those who use this paper. No one can realize its shortcomings more fully than I, but if its publication shall lead to a better understanding of our species, my object will have been accomplished.

Forty-five species are recognized in the following pages. These are divided into nine groups, which may thus be separated:

Elytra rounded at tip; head not inserted in the thorax to the eyes .....2.
Elytra subtruncate at tip, the third stria with one very small dorsal puncture near the apex; head inserted in the thorax to the eyes; mentum without foramenifrom punctures.....Group i. ænescens.
2. Mentum without foramenifrom punctures; marginal stria of elytra interrupted or less deep at middle.....3.
Mentum with two large, foramenifrom punctures behind the tooth.....5.
3. Thorax narrowly margined, the margin not translucent.....4.
Thorax broadly margined, the margin translucent; elytra with the recurved portion of the sutural stria parallel to the margin, third interval with two small dorsal punctures very near the third stria.
Group iii. flavicauda.
4. Elytra with the recurved portion of the sutural stria parallel to the margin; dorsal punctures two, the first on the fourth stria near the base, the second on the third stria near the apex.....Group ii. nanus.
Elytra with the recurved portion of the sutural stria short, nearly parallel to the suture; dorsal punctures two, these placed on the third stria when the latter is present, the second at most but slightly behind the middle.....Group iv. incurvus.
5. Elytra with the marginal stria broadly interrupted at middle (obsolete in *lævus*).....6.
Elytra with the marginal stria deep, entire; two small dorsal punctures on the third interval.....Group vi. ephippiatus.
6. Recurved portion of the sutural stria long, nearly parallel to the suture, distinctly hooked at tip.....7.
Recurved portion of the sutural stria moderately long, not hooked at tip; two dorsal punctures on the third stria, the second but slightly behind the middle; form convex.....Group v. frontalis.
Recurved portion of the sutural stria very short, parallel with the suture, not hooked at tip; two dorsal punctures on the third interval near the third stria, the second very distinctly behind the middle; form depressed.....Group vii. lævus.
7. Elytra with the first dorsal puncture on the third stria, the second at or behind the tip of the recurved portion of the sutural stria, but not enclosed within it.....Group viii. vittiger.

Elytra with the first dorsal puncture on the fourth interval, the second enclosed within the recurved portion of the sutural stria.

Group ix. proximus.

Group I. ænescens.

Head rather small, inserted in the thorax to the eyes (Pl. VI, fig. 9); mentum without forameniform punctures; antennæ with the second and third joints subequal. Thorax narrowly margined, the margin not translucent. Elytra subtruncate at tip, with one very small dorsal puncture situated close to the apex and apparently on or near the third stria; sutural stria not recurved at apex; marginal stria interrupted at middle.

The anterior tarsi are similar in the sexes.

In this group the single dorsal puncture of the elytra is extremely small, so minute, in fact, that it can be located only by the seta arising from it. It is therefore impossible to determine with certainty its actual position, whether close to or on the third stria.

Judging from our only representative it seems to stand alone more than any other group. It was placed by LeConte in *Blemus*, a genus since suppressed. By other authors it has been referred to *Lymnastis* Motsch.

1. **T. ænescens** Lec. (Plate VI, fig. 1).—Form moderately elongate, depressed. Color brownish-piceous, sometimes rufous, shining, the head usually darker, the elytra sometimes with slight iridescent lustre. Head narrower than the thorax at apex; frontal grooves short; eyes moderate, slightly prominent; antennæ scarcely one-half as long as the body, fuscous, the basal joints paler; palpi testaceous. Prothorax scarcely one-half wider than long, as wide at base as apex; apex truncate; anterior transverse impression obsolete, the posterior rather feeble and close to the base; meidan line deep, abbreviated at each end; basal impressions distinct; base truncate, obliquely so each side; sides slightly rounded in front, oblique behind; hind angles obtuse, but not rounded, not carinate. Elytra slightly wider than the thorax, subparallel, nearly oblong, striate; striæ distinct, impunctate, subentire, the inner ones scarcely deeper, the fifth slightly grooved towards the apex; intervals nearly flat. Body beneath brownish-piceous. Legs pale yellowish-testaceous. Length .07–.09 inch; 1.75–2.25 mm.

A very aberrant species with no apparent affinities, and easily recognizable from all the others in our fauna.

It is known to me only from North Carolina, Florida, Arkansas and Louisiana.

Group II. nanus.

Head not inserted in the thorax to the eyes; mentum without forameniform punctures; antennæ with the third joint distinctly longer than the second. Thorax with the side margin narrowly

reflexed and not translucent. Elytra rounded at tip, with the recurved portion of the sutural stria nearly parallel to the margin; marginal stria entire, less deep at middle, deepest towards the apex; dorsal punctures two, the first situated on the fourth stria near the base, the second on the third stria near the apex.

In the males the first two joints of the anterior tarsi are distinctly dilated, with the inner apical angles prolonged.

This group is nearly the equivalent of *Tachyta* Kirby, and seems to lead towards *Trechus* of the Pogonini. It differs notably from the others of the genus by the arrangement of the dorsal punctures of the elytra. The third joint of the antennæ is distinctly longer than the second, the two being subequal in most species of *Tachys*.

But two species occur in our fauna. Both are black and resemble each other quite closely. They may thus be separated:

Elongate, depressed; thorax about one-half wider than long, not wider at base than apex, hind angles not or but feebly carinate; elytra subparallel. Length .09–.12 inch. .... **nanus** Gyll.

Broader, slightly convex; thorax nearly twice as wide as long, wider at base than apex; hind angles carinate; elytra more oval. Length .10–.12 inch..... **falli** n. sp.

2. **T. nanus** Gyll. (Pl. VI, fig. 2).—Form elongate, more or less depressed. Color black, sometimes tinged with brownish, shining. Surface more or less finely alutaceous. Head as wide as the thorax at apex; frontal grooves distinct, extending backwards as far as the middle of the eye; eyes moderately large and prominent; antennæ less than one-half the length of the body, piceous, the basal joints more or less rufous; palpi piceous. Prothorax subquadrate, about one-half wider than long, as wide at base as apex; apex very feebly emarginate; anterior transverse impression feeble or nearly obsolete; median line distinct, abbreviated before and behind; posterior transverse impression distinct; basal impressions moderately deep; base truncate; sides rounded in front, slightly sinuate behind; hind angles rectangular, not, or very feebly, carinate. Elytra oblong-ovate, subparallel, slightly wider than the thorax, finely striate, with usually the four or five inner striæ distinct; striæ impunctate, all but the sutural abbreviated behind; dorsal punctures small, the first on the fourth stria about one-fifth from base, the second on the third stria about one-fifth from apex; intervals flat or nearly so. Body beneath black or dark piceous. Legs piceous or nearly black, the tibiæ and tarsi often somewhat tinged with rufous. Length .09–.12 inch; 2.25–3 mm.

One of our best known and most abundant species. It is subject to some variation. The striæ of the elytra vary from moderately distinct to nearly obsolete. The thorax is usually about one-half wider than long, rarely somewhat wider, while the hind angles, although usually not carinate, are occasionally feebly so.

From *falli* it may be recognized by its more elongate and more depressed form, proportionally longer thorax, which is not wider at base than apex, and by the narrower, more parallel elytra, which are less distinctly striate I have been unable to detect in *nanus* the irregular row of sparsely placed, minute, setigerous punctures which occurs on each of the elytral intervals in *falli*.

It has a very wide range of distribution, occurring over almost the entire country from the Atlantic to the Pacific, in Canada, and also in Europe and Siberia. It is most frequently met with under bark, and is also found in sifting leaves.

3. **T. falli** n. sp.—Less elongate than *nanus*, slightly convex. Color black, shining, the elytra sometimes piceous. Surface finely alutaceous. Head as wide as the thorax at apex; frontal grooves distinct, extending posteriorly behind the middle of the eye; eyes moderately large and prominent; antennæ less than one-half the length of the body, piceous, the basal joints scarcely paler; palpi piceous. Prothorax subquadrate, wider at base than apex, nearly twice as wide as long; apex slightly emarginate; anterior transverse impression feeble, the posterior distinct; median line moderately deep, abbreviated at each end; basal impressions large and deep; base truncate; sides slightly arcuate in front, feebly sinuate behind; hind angles rectangular, carinate. Elytra distinctly wider than the thorax, oblong-oval, distinctly striate; striæ impunctate, the sutural entire, the others extending nearly to apex, the seventh feeble or obsolete; dorsal punctures small, placed as in *nanus;* intervals slightly convex, each with an irregular row of very small, setigerous punctures. Body beneath black, shining. Legs piceous, sometimes tinged with rufous. Length .10–.12 inch; 2.5–3 mm.

More robust than the preceding, with the thorax broader as compared with its length and wider at base than apex. The hind angles are distinctly carinate. The elytra differ in being more deeply striate and in their more oval form and greater width as compared with the thorax.

As mentioned in the description, in addition to the usual two dorsal punctures, which are placed almost exactly as in *nanus*, there is an irregular row of very minute, sparsely placed punctures on each interval, each bearing a very short seta. This recalls a similar structure in the next group, in which, however, the true dorsal punctures are differently placed.

I take great pleasure in dedicating this species to my friend, Mr. H. C. Fall, of Pasadena, Cal., to whom I am under obligations for many favors.

More than twenty examples have been studied, both sexes being represented in the material before me.

It occurs in the Pacific coast region, being known to me from

Siskiyon County (Ricksecker) and Lake Tahoe (Fall), California, Oregon, Olympia, Wash. and Vancouver Island.

Group III. flavicauda.

Head not inserted in the thorax to the eyes; mentum without forameniform punctures; antennæ submoniliform, the first three joints normal, the second and third subequal, joints 4–10 shorter and more rounded, subequal, the terminal longer, subacute at tip. Thorax broadly margined, the margin translucent. Elytra rounded at tip, with two small dorsal punctures on the third interval very close to the third stria; recurved portion of the sutural stria nearly parallel to the margin, not hooked at tip; marginal stria much less deep or nearly effaced at middle.

The first two joints of the anterior tarsi are dilated in the males.

But one species is included in this group.

4. **T. flavicauda** Say (Plate VI, fig. 3).—Form rather broad, feebly convex. Color dark piceous or nearly black, the apical third of the elytra yellowish. Surface finely and rather sparsely alutaceus, slightly shining. Head as wide as the thorax at apex; frontal grooves short, not extending behind the middle of the eyes; eyes moderately large and prominent; antennæ less than one-half as long as the body, rufo-testaceous, slightly darker towards the tip; palpi pale testaceous, the terminal joints of both pairs rather longer than usual in the genus. Prothorax about one-half wider than long, slightly wider at base than apex, subquadrate; apex emarginate, the anterior angles slightly prominent; transverse impressions distinct, the posterior deeper; median line moderately deep, extending between the transverse impressions; basal impressions moderate; base truncate; sides feebly arcuate from apex nearly to base, obsoletely sinuate in front of the hind angles, which are rectangular and not carinate. Elytra oblong-ovate, nearly one-half wider than the thorax, the five inner striæ moderately distinct; striæ impunctate; dorsal punctures very small, the first slightly in front of the middle, the second about one-fourth from apex; intervals nearly flat, each with an irregular row of minute punctures, from each of which proceeds a very short seta. Body beneath piceous, the abdomen usually more or less tinged with rufous, especially towards the tip. Legs rufo-testaceous. Length .06–.07 inch; 1.5–1.75 mm.

A very well-known and characteristic little species, incapable of being confused with any other in our fauna.

The antennæ resemble most closely those of *lævus* and *rufotestaceus*, except that the second joint is not longer than the third.

The dorsal punctures of the elytra are very small (Plate VI, fig. 3), so small, in fact, that they can usually be located only by the setæ arising from them, except under high power. The presence of irregular rows of minute setigerous punctures on the elytral intervals recalls a similar arrangement in *T. falli*.

It is very widely distributed. Specimens have been examined from Canada, Massachusetts, New York, Pennsylvania, North and South Carolina, Florida, Michigan, Tennessee, Wisconsin, Iowa, Arkansas, Nebraska, Arizona, California and Washington.

Group IV. incurvus.

Form usually more or less convex. Head not inserted in the thorax to the eyes; mentum without forameniform punctures; antennæ with the second and third joints subequal. Thorax narrowly margined, the margin not translucent. Elytra rounded at tip with two dorsal punctures, these placed on the third stria when the latter is present, the second at or slightly behind the middle; recurved portion of the sutural stria short and nearly parallel to the suture, not hooked at tip; marginal stria broadly interrupted at middle.

In the males the first two joints of the anterior tarsi are more or less dilated.

The largest group of the genus as regards number of species. Many resemble each other quite closely and are not capable of easy definition, although several retain a characteristic facies difficult of expression in words. The members of the group are easily recognizable by the characters given in the table for the definition of groups. The arrangement of the dorsal punctures and the sutural stria are illustrated on Plate VI, fig. 4.

It will be observed in more than one-half of our species that the median line of the thorax terminates on the posterior transverse impression in a large puncture, while on each side at a short distance from it is another of about the same size. Such are described as having "the posterior transverse impression tripunctate at middle." In the others these punctures are lacking. This character is shown on Plate VI, figs. 10 and 11. It seems a good one for the separation of several species otherwise closely allied.

In all our species the frontal grooves are short, not extending posteriorly behind the middle of the eye.

The elytral striæ are impunctate in all except *ferrugineus*, in which the sutural stria is punctulate. Their number varies in the different species, but I am inclined to think that some authors have placed too much reliance on this character. I have accordingly made use of it only when accompanied by others.

The following table is offered with the hope that it may assist the

student in the determination of our species. They follow in the text in what seems to be the best order for cabinet arrangement:

Elytra with all the striæ impunctate.....2.
Elytra with the sutural stria distinctly punctulate; thorax with the posterior transverse impression tripunctate at middle.....10.
2. Thorax with the posterior transverse impression not tripunctate at middle..3.
Thorax with the posterior transverse impression tripunctate at middle.....6.
3. Very convex; sides of thorax strongly rounded in front, oblique behind...4.
Moderately convex; sides of thorax slightly arcuate in front, feebly sinuate behind.....5.
4. Robust; piceous or nearly black, elytra usually more or less brownish; thorax scarcely as wide at base as apex; posterior transverse impression deep; elytra with the sutural stria deep, the other dorsal striæ obsolete; legs testaceous. Length .07–.08 inch.....**granarius** Dej.
More elongate; piceous, sometimes slightly tinged with rufous; thorax as wide at base as apex, posterior transverse impression feeble; legs testaceus. Length .10 inch.....**fuscicornis** Chaud.
5. Thorax slightly wider at base than apex; elytra distinctly wider than the thorax.
Moderately elongate; piceous or rufo-piceous, the elytra with an ill-defined vitta or subhumeral and subapical spots pale; sutural stria deep, the other dorsal striæ obsolete; legs testaceous. Length .07–.09 inch.
incurvus Say.
Very elongate; rufo-testaceous, elytra rarely slightly darker on the disk; elytra oblong-elliptical, elongate, striate as in *incurvus;* legs testaceous. Length .09–.11 inch.....**dolosus** Lec.
Thorax not wider at base than apex; rufous or rufo-piceous; elytra slightly wider than the thorax, striate as in *incurvus;* legs testaceous. Length .08–.09 inch.....**rapax** Lec.
6. Thorax not wider at base than apex.....7.
Thorax wider at base than apex.....8.
7. Elongate; rufous or rufo-piceous; thorax about one-half wider than long, sides slightly rounded in front, at most feebly sinuate behind, posterior transverse impression feebly tripunctate; elytra slightly wider than the thorax with a deep sutural stria, the other dorsal striæ obsolete; legs testaceous. Length .08–.10 inch.....**audax** Lec.
Robust; piceous or nearly black, elytra usually pale at apex: thorax nearly twice as wide as long, sides strongly rounded in front, oblique behind, posterior transverse impression distinctly tripunctate; elytra distinctly wider than the thorax, with a sutural and one to three abbreviated dorsal striæ; legs testaceous. Length .07–.09 inch.
xanthopus Dej.
8. Form convex.....9.
Form subdepressed; dark brown or piceous, the elytra often paler at the sides; thorax but slightly wider at base than apex; elytra with a sutural and three or four abbreviated dorsal striæ; legs testaceous. Length .11–.13 inch.....**tripunctatus** Say.
9. Reddish brown or piceous, the elytra paler at sides and tip; thorax less narrowed behind than in *tripunctatus*, sides rounded in front, feebly sinu-

ate behind; elytra with a sutural and two or three abbreviated dorsal striæ; legs testaceous. Length .09–.11 inch..... **vivax** Lec.

Elongate; black, very shining; thorax about one-half wider than long, sides rounded to behind the middle, sinuate behind; elytra with a sutural and two abbreviated dorsal striæ, the two inner deep, the third feebly marked; legs testaceous. Length .09–.12 inch..... **capax** Lec.

Very robust; dark rufo-piceous, the elytra gradually paler towards the tip; thorax twice as wide as long, sides strongly arcuate nearly to base, sinuate in front of the hind angles; elytra with a sutural and two abbreviated dorsal striæ; legs rufous. Length .08 .10 inch.
liebecki n. sp.

Moderately elongate; black, shining; thorax about one-half wider than long, very slightly wider at base than apex, sides rounded in front, slightly sinuate behind; elytra with a deep sutural and from one to three abbreviated dorsal striæ; legs rufous or rufo-piceous, the femora darker. Length .08–.10 inch..... **anthrax** Lec.

Robust; ferrugineous or rufo-piceous, the elytra often with the sides and apex somewhat paler; thorax scarcely one-half wider than long, sides arcuate in front, feebly sinuate behind; elytra slightly wider than the thorax, with a deep sutural stria, the other dorsal striæ obsolete; legs testaceous. Length .08–.11 inch..... **nebulosus** Chaud.

Larger, robust; ferrugineous or rufo-piceous, elytra with an ill-defined subhumeral and subapical spot or the entire margin somewhat paler; thorax rather more than one-half wider than long, sides rounded, more or less sinuate in front of the hind angles; elytra about one-half wider than the thorax, the sutural stria deep, rarely with traces of a second stria; legs testaceous. Length .12–.15 inch.
obesulus Lec.

10. Robust; ferrugineous; elytra with a deep sutural stria, a finer abbreviated second stria and rarely with traces of a third; legs testaceous. Length .10–.13 inch..... **ferrugineus** Dej.

5. **T. granarius** Dej.—Form robust. Color variable, usually piceous or nearly black, the elytra more or less brownish and somewhat translucent, sometimes rufo-piceous or ferrugineous, the head and thorax darker; surface very shining. Head scarcely narrower than the thorax at apex; eyes large and prominent; antennæ scarcely one-half as long as the body, fuscous, the basal joints testaceous; palpi dark rufous. Prothorax subquadrate, rather more than one-half wider than long, scarcely narrower at base than apex; apex truncate; median line fine, abbreviated at each end; anterior transverse impression obsolete, the posterior deep, finely punctulate, not tripunctate at middle; basal impressions distinct; base truncate; sides with the margin very narrowly reflexed, arcuate in front, oblique behind, feebly sinuate immediately in front of the hind angles, which are subrectangular, with a very short, fine carina. Elytra oblong-oval, less than one-half wider than the thorax; sutural stria deep, impunctate, not attaining the base; the other dorsal striæ obsolete; dorsal punctures small, the first slightly in front of, the second slightly behind, the middle. Body beneath piceous or rufo-piceous, the thorax usually more or less tinged with brown. Legs testaceous. Length .07–.08 inch; 1.75–2 mm.

The sinuation in front of the hind angles is variable, being situated very close to the angle, and in some specimens so feeble as to be with difficulty discerned. In these the hind angles would be better described as obtuse. In the other extreme, however, where it is most strongly marked, they are decidedly rectangular. The two are connected by numerous gradations in the series before me.

This pretty little species seems nearly related to *incurvus*. Its very robust and convex form and the form of the thorax will serve, however, to separate it. The ill-defined elytral vitta, which is almost always to be seen in the latter species, is here entirely wanting.

It occurs from Canada and the New England States southward to Florida and westward to Nebraska.

6. **T. fuscicornis** Chaud.—Form elongate, very convex. Color piceous, slightly tinged with rufous, shining. Head as wide as the thorax at apex; eyes large, prominent; antennæ less than one-half the length of the body, fuscous, the basal joints testaceous; palpi rufo-testaceous. Prothorax subquadrate, as wide at base as apex, about one-half wider than long; apex truncate; anterior transverse impression obsolete, the posterior rather feebly impressed, finely punctulate and not tripunctate at middle; median line very fine, abbreviated at each end; basal impressions small; base truncate; sides with the margin narrowly reflexed, strongly arcuate in front, oblique behind; hind angles obtuse, not carinate. Elytra slightly wider than the thorax, oblong-oval, elongate, with a moderately deep, impunctate, sutural stria, which does not attain the base, the other dorsal striæ obsolete; first dorsal puncture about one-fourth from base, the second slightly behind the middle. Body beneath rufo-piceous, the head and thorax slightly paler, as are also the last segments of the abdomen; epipleuræ dark rufous. Legs testaceous. Length .10 inch; 2.5 mm.

Most nearly related to *granarius*, but more elongate and larger, with the posterior transverse impression feeble. *T. gemellus* Casey is without doubt synonymous.

The above description was taken from a unique in the LeConte collection received from Chaudoir.

Described by Baron Chaudoir from Louisiana.

7. **T. incurvus** Say.—Form elongate, moderately convex. Color varying from rufo-piceous to nearly black, shining, the elytra usually with an ill-defined pale vitta extending from the humerus nearly to the apex and dilated at each end, sometimes interrupted at middle, being then represented by a humeral and subapical spot. Head as wide as the thorax at apex; eyes large, prominent; antennæ rather less than one-half the length of the body, the basal joints testaceous, the outer ones more or less fuscous. Prothorax quadrate, about one-half wider than long, distinctly wider at base than apex; apex truncate; anterior transverse impression obsolete; median line very fine, abbreviated at each end; posterior transverse impression deep, distinctly punctulate, not tripunctate at

middle; basal impressions deep; base truncate; sides slightly arcuate in front, feebly sinuate behind, the margin very narrowly reflexed; hind angles rectangular, with a very short, fine carina. Elytra slightly elongate, oblong-ovate, slightly wider than the thorax, with a moderately deep, impunctate, sutural stria, which does not attain the base; dorsal punctures small, the first slightly in front of, the second slightly behind, the middle. Body beneath piceous or rufo piceous. Legs testaceous. Length .07–.10 inch; 1.75–2.5 mm.

This species bears considerable resemblance to *nebulosus* Chaud., but differs essentially by the absence of the three large punctures at the middle of the posterior transverse impression of the thorax (Plate VI, fig. 10) and by its less robust form. Great variation in color is shown in a large series, and the markings of the elytra, although always ill-defined, vary in distinctness. Rarely they are almost completely wanting. In a few specimens examined, very faint traces of a second stria are discernable.

It is frequently found in ants' nests, although far from strictly myrmecophilous in its habits. All that I have seen thus collected were taken in the nests of *Formica exsectoides* Fovel.

It has a very wide range of distribution, extending from Canada and the New England States southward to Florida and Texas and westward to the Pacific coast, specimens having been seen from British Columbia, Washington and Oregon.

8. **T. dolosus** Lec.—Form very elongate, slightly convex. Color testaceous or pale rufous, shining. Head as wide as the thorax at apex; eyes large, prominent; antennæ less than one-half the length of the body, testaceous, the outer joints scarcely darker; palpi testaceous. Prothorax quadrate, about one-half wider than long, slightly wider at base than apex; apex truncate; median line fine, abbreviated at each end; anterior transverse impression obsolete, the posterior deep, finely punctate, not tripunctate at middle; basal impressions small, moderately deep; base truncate; sides with the margin very narrowly reflexed, slightly rounded in front, feebly sinuate behind; hind angles rectangular, very finely carinate. Elytra elongate, oblong-elliptical, nearly one-half wider than the thorax, with a deep, impunctate, sutural stria, which does not attain the base, the other dorsal striæ obsolete; dorsal punctures small, the first slightly in front of, the second slightly behind, the middle. Body beneath pale rufous. Legs testaceous. Length .09–.11 inch; 2.25–2.75 mm.

Most closely allied to *incurvus*, but distinct by its much more elongate form and uniform pale color.

It occurs in the Eastern and Southern States, Iowa, Missouri, Kansas, Texas, Colorado, New Mexico and Arizona.

9. **T. rapax** Lec.—Form elongate, moderately convex. Color rufous or rufo-testaceous, shining. Head as wide as the thorax at apex; eyes large, prominent; antennæ less than one-half as long as the body, pale fuscous, testaceous at base;

palpi testaceous. Prothorax scarcely one-half wider than long, as wide at base as apex, subquadrate; anterior transverse impression obsolete, the posterior deep, finely punctulate, not tripunctate at middle; median line fine, abbreviated before and behind; basal impressions distinct; base truncate; sides with the margin very narrowly reflexed, slightly arcuate in front, feebly sinuate behind; hind angles subrectangular, very finely carinate. Elytra elongate, nearly elliptical, slightly wider than the thorax; sutural stria deep, impunctate, the other dorsal striæ obsolete; first dorsal puncture slightly in front of, the second slightly behind, the middle. Body beneath rufous or rufo-piceous. Legs testaceous. Length .08–.09 inch; 2–2.5 mm.

So closely allied to the next species as in some instances to be with difficulty separable. The only difference which can be relied upon is to be found in the absence in *rapax* of the three punctures at the middle of the base of the thorax on the posterior transverse impression. These are present in *audax,* although more feebly marked than in the other species in which they occur.

It is known to me only from California and Arizona.

10. **T. audax** Lec.

This species resembles the preceding so closely as to require no special description. In fact, apparently the only constant difference between them is to be seen in the posterior transverse impression of the thorax, which is feebly tripunctate at middle in the present species, while it is not at all so in *rapax.* The punctures are less clearly marked than in the other species in which the thorax is similarly impressed, and, as the transverse impression is finely punctate, both in this species and in *rapax,* great care must be taken in separating them. In comparing the two it will be observed that in the latter the sides of the thorax are usually slightly more sinuate behind, and the hind angles consequently more nearly rectangular. The difference, however, is not constant. The basal impressions of the thorax are generally slightly smaller in *audax* than in *rapax.*

From *dolosus,* which it closely resembles, it differs by the thorax proportionally less wide at base than apex, the tripunctate transverse impression, and by its slightly more convex form.

In color it varies from rufous to rufo-piceous, specimens being sometimes seen in which the elytra have a very ill-defined humeral spot and another near the apex slightly paler. Its size is the same as *rapax.*

It occurs in California and Arizona, and examples have also been seen from El Paso, Tex., and from Utah and Western Colorado.

11. **T. anthrax** Lec.—Form moderately elongate, convex. Color black, shining. Head as wide as the thorax at apex; eyes moderately large and prominent; antennæ less than one-half as long as the body, piceous, the basal joints paler; palpi rufo-piceous. Prothorax subquadrate, about one-half wider than long, very slightly wider at base than apex; apex truncate; anterior transverse impression obsolete; median line fine, abbreviated in front and behind; posterior transverse impression deep, finely punctulate, tripunctate at middle; basal impressions deep; base truncate; sides rounded in front, slightly sinuate behind, the margin very narrowly reflexed; hind angles rectangular, finely carinate. Elytra oblong-oval, less than one-half wider than the thorax, with a deep sutural stria and from one to three abbreviated dorsal striæ; striæ impunctate; first dorsal puncture about one-third from base, the second about one-third from apex. Body beneath black, shining. Legs rufous or rufo-piceous, the femora darker. Length .08-.11 inch; 2-2.75 mm.

A well-marked and easily recognizable species. The posterior dorsal puncture of the elytra is placed somewhat further behind the middle than is usual in the present group.

It occurs in California.

12. **T. nebulosus** Chaud.—Form robust. Color varying from ferrugineous to rufo-piceous, shining, the elytra usually with the sides and apex somewhat paler. Head as wide as the thorax at apex; eyes large, prominent; antennæ nearly one-half as long as body, pale fuscous, the basal joints testaceous. Prothorax subquadrate, wider at base than apex, scarcely one-half wider than long; apex truncate; anterior transverse impression obsolete, the posterior distinct, finely punctate, tripunctate at middle; median line very fine, abbreviated before and behind; basal impressions distinct; base truncate; sides with the margin very narrowly reflexed, slightly rounded to behind the middle, feebly sinuate in front of the hind angles, which are rectangular and feebly carinate. Elytra slightly wider than the thorax, oblong-oval, with the sutural stria deep, impunctate, not attaining the base, the other dorsal striæ obsolete; first dorsal puncture about one-fourth from base, the second very slightly behind the middle. Body beneath rufo-piceous or ferrugineous. Legs testaceous. Length .08-.11 inch; 2-2.75 mm.

This seems to be a well-marked species, subject to but slight variation. Its affinities are towards *vivax* on the one hand and *incurvus* on the other. It is not, as a rule, very common in collections, and large specimens of the latter are often referred to it. These may at once be distinguished from the present species by the absence of the three large punctures at the middle of the posterior transverse impression of the thorax.

It occurs in Louisiana, Texas, Colorado and Utah. A single example labelled "Montreal, Can.," has been seen.

13. **T. liebecki** n. sp.—Form very robust. Color dark rufo-piceous, very shining, the elytra gradually paler towards the tip. Head as wide as the thorax at apex; eyes large, prominent; antennæ scarcely one-half as long as the body,

pale fuscous, the basal joints rufous, second and third subequal; palpi rufous. Prothorax very convex, subquadrate, twice as wide as long, wider at base than apex; apex truncate; anterior transverse impression obsolete, the posterior deep, tripunctate at middle; median line fine, abbreviated at each end; basal impressions rather small, deep; sides with the margin narrowly reflexed, strongly arcuate nearly to base, sinuate immediately in front of the hind angles, which are rectangular and finely carinate. Elytra slightly wider than the thorax, oblong-oval, with a sutural and two dorsal striæ, also sometimes with traces of a fourth stria; striæ impunctate, the two inner much deeper, the sutural only attaining the apex; dorsal punctures on the third stria, the first slightly in front of, the second slightly behind, the middle. Body beneath piceous, the abdomen more or less tinged with rufous. Legs rufous. Length .08–.10 inch; 2–2.5 mm.

Very distinct in facies from any species in our fauna. Its very robust form, together with the characters above given, will, I think, serve to distinguish it.

Four specimens, two of each sex, are known to me. Of these one is in the collection of the late Dr. Horn, now a part of that of the American Entomological Society, one in the LeConte collection, one in that of Mr. Charles Liebeck, and the other in my own cabinet. For the latter I am indebted to Mr. Liebeck, whose name I take pleasure in assigning to the species as a slight token of gratitude for many favors.

It occurs in Texas.

14. **T. xanthopus** Dej.—Form robust. Color piceous or nearly black, shining, the elytra usually paler at tip. Head as wide as the thorax at apex; eyes large, prominent; antennæ about one-half the length of the body, piceous, the basal joints testaceous; palpi rufous. Prothorax as wide at base as apex, subquadrate, nearly twice as wide as long; apex truncate; anterior transverse impression obsolete, the posterior distinct, tripunctate at middle; median line very fine, abbreviated before and behind; basal impressions broad, deep; base truncate; sides with the margin very narrowly reflexed, strongly arcuate in front, oblique behind, at most but feebly sinuate immediately in front of the hind angles, which are subobtuse, but not rounded, not carinate. Elytra distinctly wider than the thorax, oblong-oval, with from two to four dorsal striæ, the sutural only attaining the apex; striæ impunctate; dorsal punctures distinct; intervals convex. Body beneath piceous. Legs testaceous. Length .07–.09 inch; 1.75–2.25 mm.

The striation of the elytra varies as indicated above. Dejean describes the elytra as "striis duabus dorsalibus distinctis," and while this applies to many examples, others occur with three or even four well-marked striæ. As such examples are found throughout its entire range, and are separable by no other characters, we can regard them only as individual variations of one species. The coloration also varies, and, although the elytra are usually paler at

tip, they are sometimes entirely piceous or black. In a large series it will be observed that the sides of the thorax, although usually not sinuate behind, are in some individuals feebly so immediately in front of the hind angles, which thus become more nearly rectangular. This is seen only when the thorax is slightly separated from the base of the elytra. Such specimens are often difficult to distinguish from small examples of *capax*, especially if the elytra are unicolorous.

It is widely distributed, occurring from Massachusetts to Florida, and westward to Texas and New Mexico. Mr. H. W. Wenzel writes me that in New Jersey he has taken it in cranberry-bogs.

15. **T. capax** Lec.—Form rather elongate, convex. Color black, very shining. Head as wide as the thorax at apex; eyes large and prominent; antennæ less than one-half as long as the body, dark fuscous or piceous, paler at base; palpi testaceous. Prothorax subquadrate, wider at base than apex, about one-half wider than long; apex truncate; anterior transverse impression obsolete, the posterior deep and distinctly tripunctate at middle; median line very fine, abbreviated before and behind; basal impressions broad, deep; base truncate; sides strongly rounded to behind the middle, sinuate for a short distance in front of the hind angles, which are rectangular and finely carinate. Elytra oblong-oval, less than one-half wider than the thorax, with the two inner striæ deep, the third feebly marked, the sutural only attaining the apex; striæ impunctate, the third with the first dorsal puncture about one-fourth from base, the second slightly behind the middle; the two inner intervals slightly convex. Body beneath piceous, the abdomen slightly paler. Legs rufo-testaceous, the femora usually slightly darker. Length .09–.12 inch; 2.25–3 mm.

This species seems most nearly related to *xanthopus* Dej., than which it is usually larger and more elongate, with the thorax wider at base than apex, and the hind angles more prominent and very finely carinate. Small specimens might easily be confused with larger examples of the latter species, and considerable care is sometimes required in separating them.

It was described by LeConte from the District of Columbia. Specimens have also been seen from Anglesea, N. J. (Liebeck and H. W. Wenzel), Biscayne, Fla. (Mrs. Slosson), Missouri and Iowa City, Iowa (Wickham). It is not common in collections.

16. **T. vivax** Lec.—Form convex. Color reddish brown, rarely rufo-piceous, shining, the elytra paler at sides and tip. Head as wide as the thorax at apex; eyes large, prominent; antennæ about one-half the length of the body, testaceous, the outer joints fuscous; palpi testaceous. Prothorax subquadrate, distinctly wider at base than apex, rather more than one-half wider than long; apex truncate; anterior transverse impression obsolete, the posterior distinct,

finely punctulate, tripunctate at middle; median line fine, abbreviated at each end; basal impressions broad, deep; base truncate; sides rounded in front, nearly parallel and feebly sinuate behind, the margin narrowly reflexed; hind angles rectangular, with a short, fine carina. Elytra oblong-oval, nearly one-half wider than the thorax, with the three or four inner striæ distinct, the two inner deeper, all but the sutural abbreviated behind; striæ impunctate, the third with the first dorsal puncture slightly in front of, the second slightly behind, the middle; intervals nearly flat, the two inner feebly convex. Body beneath ferrugineous or rufo-piceous, the last segments of the abdomen sometimes paler. Legs testaceous. Length .09–.11 inch; 2.25–2.75 mm.

Most nearly allied to *tripunctatus* Say, but distinct by its more convex form, and by the form of the thorax. The two are often confused in collections.

It occurs in the Eastern States, extending westward to Iowa.

17. **T. tripunctatus** Say (Plate VI, fig. 4).—Form rather elongate, subdepressed. Color brown or piceous, shining, the elytra slightly paler at the sides. Head as wide as the thorax at apex; eyes large, prominent; antennæ about one-half as long as the body, fuscous, the basal joints paler; palpi testaceous. Prothorax subquadrate, about one-half wider than long, slightly wider at base than apex; apex truncate; anterior transverse impression obsolete, the posterior deep, finely punctate, tripunctate at middle; median line fine, abbreviated at each end; basal impressions distinct; base truncate; sides rounded in front, slightly sinuate behind, the margin narrowly reflexed; hind angles rectangular, with a short, fine carina. Elytra oblong-ovate, about one-half wider than the thorax, with four or five distinct striæ, the three inner deep, the first only entire; striæ impunctate; dorsal punctures distinct, the first slightly in front of, the second slightly behind, the middle; intervals feebly convex. Body beneath reddish brown or piceous. Legs testaceous. Length .11–.13 inch; 2.75–3.25 mm.

A large and well-marked species, less convex than the others of the group. From *virax*, to which it is most nearly related, it may, in addition, be distinguished by its somewhat larger size and more elongate form, with the thorax more narrowed behind. The striæ of the elytra are usually more deeply impressed than in the latter species, but this is subject to some variation, the outer two being sometimes nearly effaced.

Known to me from Canada, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Virginia, Tennessee, Iowa and Texas.

18. **T. obesulus** Lec.—Form robust. Color varying from ferrugineous to rufo-piceous, shining, the elytra usually with either a subhumeral and a subapical spot or the entire margin paler. Head as wide as the thorax at apex; eyes large, prominent; antennæ nearly one-half as long as the body, rufo-testaceous, the outer joints somewhat darker; palpi rufo-testaceous. Prothorax subquadrate, rather more than one-half wider than long, wider at base than apex;

apex nearly truncate; anterior transverse impression nearly obsolete, the posterior deep, tripunctate at middle; median line fine, abbreviated before and behind; basal impressions broad, deep; base truncate; sides with the margin narrowly, but distinctly, reflexed, rounded, more or less sinuate in front of the hind angles, which are rectangular and carinate. Elytra oblong-oval, about one-half wider than the thorax, with a deep, impunctate sutural stria and sometimes with traces of a second stria; first dorsal puncture slightly in front of, the second slightly behind, the middle. Body beneath ferrugineous or rufo-piceous. Legs testaceous. Length .12-.15 inch; 3-3.75 mm.

Readily distinguishable from the others of the group by its more robust form and larger size. From *ferrugineus*, which in general facies it most nearly resembles, it is at once recognizable by its impunctate sutural stria and more prominent eyes. The sinuation of the sides of the thorax varies from moderately deep to feeble, and with it the hind angles vary from scarcely rectangular to almost subacute, being more prominent in specimens in which the sinuation is deepest. The angular carina is also more marked in some examples than in others. The spots on the elytra, when present, are not well defined, and in specimens in which the margin is paler, the pale color of the sides gradually merges into the darker color of the disk.

It occurs in Arizona and California.

19. **T. ferrugineus** Dej.—Form robust. Color ferrugineous, shining. Head slightly elongate, as wide as the thorax at apex; eyes rather small, somewhat flattened; antennæ scarcely one-half as long as the body, pale fuscous, more or less testaceous at base; palpi testaceous. Prothorax about one-half wider than long, wider at base than apex, subquadrate; apex very slightly emarginate; anterior transverse impression obsolete, the posterior distinct, finely punctate, tripunctate at middle; median line distinct, abbreviated at each end; basal impressions broad, moderately deep; base truncate; sides with the margin narrowly reflexed, slightly arcuate in front, feebly sinuate behind; hind angles rectangular, not carinate. Elytra more than one-half wider than the thorax, nearly oval, convex, with a sutural and one fine, abbreviated dorsal stria, rarely also with traces of a third; sutural stria distinctly punctulate to behind the middle; first dorsal puncture about one-fourth from base, the second very slightly behind the middle. Body beneath ferrugineous. Legs testaceous. Length .10-.13 inch; 2.5-3.25 mm.

A very distinct species, easily recognizable from the others of the group. The superficial resemblance between it and the next is, however, quite strong, but the two may be distinguished by several characters besides the difference in the structure of the mentum, on account of which the latter is placed in a separate group. Among these the most marked are the greater length of the frontal grooves,

the proportionally longer third joint of the antennæ and the more numerous, punctured striæ of *frontalis*, and the tripunctate posterior transverse impression of the thorax of the present species. The thorax is also less narrowed behind than in *frontalis*.

So far as I am aware it is entirely myrmecophilous in its habits, occurring in the nests of *Lasius umbratus* Nyl. var. *minutus* Em.

It is known to me from Massachusetts, New York, Pennsylvania, the District of Columbia, North and South Carolina, Ohio, Tennessee, Iowa and Missouri

Group V. frontalis.

Form convex. Head not inserted in the thorax to the eyes; mentum with two large forameniform punctures behind the tooth; antennæ with the third joint slightly longer than the second. Thorax narrowly margined, the margin not translucent. Elytra rounded at tip, with two dorsal punctures on the third stria, the second only slightly behind the middle; recurved portion of the sutural stria nearly parallel to the suture, not hooked at tip; marginal stria broadly interrupted at middle.

The males have the first two joints of the anterior tarsi slightly dilated.

This group seems intermediate in many respects between the preceding and the next. With it begins a series having two large forameniform punctures on the mentum behind the base of the tooth. These are represented on Plate VI, fig. 13.

But one species occurs in our fauna. In facies it resembles quite closely *T. ferrugineus* of the last group.

20. **T. frontalis** n. sp.—Form convex. Color ferrugineous or rufotestaceous, shining. Head elongate, as wide as the thorax at apex; frontal grooves long, deep, extending posteriorly to the hind margin of the eye; eyes moderate, slightly flattened; antennæ about one-half the length of the body, pale fuscous, the basal joints more or less testaceous; palpi testaceous. Prothorax subquadrate, about one-half wider than long, wider at base than apex; apex truncate; anterior transverse impression distinct, the posterior deep, punctate, not tripunctate at middle; median line distinct, extending between the transverse impressions; basal impressions broad, deep; base truncate; sides with the margin narrowly reflexed, more widely towards the base, arcuate in front, sinuate behind; hind angles rectangular, prominent, not carinate. Elytra more than one-half wider than the thorax, nearly oval, convex, with a sutural and three abbreviated dorsal striæ; striæ distinctly punctulate, becoming shorter and less deep externally, the third with the first dorsal puncture about one-fourth from base, the second slightly behind the middle; intervals feebly convex. Body beneath ferrugineous. Legs testaceous. Length .11–.13 inch; 3.25 3.75 mm.

One of the best marked species of the genus. The only other with which it can possibly be confused is *ferrugineus* Dej., from which it differs by numerous structural characters of importance.

For a long time it was known to me only by a somewhat mutilated unique from Eastern Massachusetts, but through the kindness of Mr. Charles Liebeck I have recently had an opportunity of studying several other specimens, and to his generosity I am indebted for the only perfect examples in my cabinet.

It has thus far been taken in Eastern Massachusetts, at Peekskill, N. Y. and at Philadelphia, Pa.

Group VI. ephippiatus.

Form elongate. Head not inserted in the thorax to the eyes; mentum with two large forameniform punctures behind the tooth; antennæ with the second and third joints subequal. Thorax with the margin not translucent. Elytra rounded, distinctly striate, with two small dorsal punctures on the third interval; marginal stria deep, entire.

The anterior tarsi are similar in the sexes.

This group is the equivalent of *Pericompsus*, a genus erected by LeConte for the reception of *T. ephippiatus* Say.* As suggested by Dr. Horn in his monograph of the Carabidæ,† the characters on which it is based are rather those of a group of species than of generic value. The species composing it differ primarily from those of the other groups by the deep marginal stria, which is not interrupted or less deep at middle. The elytral striæ are more numerous than in most other *Tachys*, and in all our species are distinctly punctate, a character of comparatively rare occurrence in the genus. A larger number than usual are entire, so that the appearance of the recurved sutural stria, so marked in nearly all the groups, is here almost lost, the fifth being grooved at apex, as is usual in *Bembidium*.

Our three species may thus be separated:

Thorax and elytra broadly margined, surface subopaque.
  Thorax nearly as long as wide, strongly narrowed behind, the anterior angles slightly prominent and acute. Length .12–.16 inch....**sellatus** Lec.
Thorax and elytra narrowly margined; surface shining.
  Convex; thorax slightly wider than long, distinctly narrower at base than apex; elytra very distinctly wider than the thorax, sides arcuate. Length .10–.13 inch.....**ephippiatus** Say.

* Ann. Lyc., 1851–2, v, p. 191.

† Trans. Am. Ent. Soc., 1881, ix, p. 134.

Subdepressed, very elongate; thorax one-half wider than long, slightly narrower at base than apex; elytra slightly wider than the thorax, subparallel. Length .10–.13 inch..... **lætulus** Lec.

21. **T. sellatus** Lec.—Form slender, elongate, convex. Color rufo-testaceous, subopaque, the elytra with a large, common, more or less clearly defined discal spot fuscous or piceous. Head scarcely as wide as the thorax; frontal grooves distinct, extending backwards to the hind margin of the eye; eyes large, prominent; antennæ about one-half the length of the body, ferrugineous, the outer joints scarcely darker; palpi rufo-testaceous. Prothorax subcordate, nearly as long as wide, widest in front of the middle, very distinctly narrower at base than apex; apex slightly emarginate, the anterior angles slightly prominent and acute; anterior transverse impression obsolete, the posterior rather feeble; median line distinct, entire; basal impressions distinct, linear; base truncate; sides broadly margined, arcuate in front, oblique behind, distinctly sinuate in front of the hind angles, which are rectangular, not carinate. Elytra more than one-half wider than the thorax, oblong oval, broadly margined, elongate, with six deep dorsal striæ; striæ deeply punctate, subentire, the fifth slightly grooved at tip; intervals convex, the third with the first dorsal puncture about one-fourth from base, the second about the middle. Body beneath rufo-piceous, the abdomen slightly paler. Legs rufo-testaceous. Length .13–.16 inch; 3.25 4 mm.

Very distinct from the others of the group.

The discal spot on the elytra is subject to some variation. It is usually margined posteriorly and sometimes also anteriorly with piceous, and is often not clearly defined. In most specimens examined the suture is also infuscate.

Occurs in Arizona and at Yuma, Cal.

22. **T. ephippiatus** Say.—Form slender, elongate, convex. Color rufo-testaceous, shining, the elytra with a large, common discal spot and sometimes with a subbasal one varying from rufo-piceous to nearly black. Head scarcely narrower than the thorax; frontal grooves distinct, extending posteriorly to the hind margin of the eye; eyes large, prominent; antennæ less than one-half as long as the body, rufo-testaceous, the outer joints scarcely darker; palpi testaceous. Prothorax subcordate, slightly wider than long, narrower at base than apex; apex nearly truncate, the anterior angles not prominent; anterior transverse impression feeble or obsolete, the posterior deep, punctate and slightly rugose; median line fine, abbreviated at each end; basal impressions small; base truncate; sides with the margin very narrowly reflexed, arcuate in front, sinuate behind; hind angles rectangular, not carinate. Elytra elongate, oblong-oval, about one-half wider than the thorax, less widely margined than in *sellatus*, with six moderately deep dorsal striæ; striæ distinctly punctate, somewhat less deeply towards the tip, subentire, the fifth deeply grooved at apex; intervals feebly convex, the third with the first dorsal puncture about one-fourth from base, the second slightly behind the middle. Body beneath rufous or rufo-piceous. Legs testaceous. Length .10–.13 inch; 2.5–3.25 mm.

Readily distinguishable from the other two species of the group by the characters given above. The extent and depth of color of

the dark markings of the elytra varies to a considerable degree, the elytra varying from testaceous, faintly clouded on the disk with dusky, to nearly black, broadly margined with testaceous.

It occurs throughout the eastern United States from New England to Texas.

23. **T. lætulus** Lec.—Form slender, elongate, subdepressed. Color nearly as in *ephippiatus*. Head scarcely narrower than the thorax; frontal grooves distinct, extending posteriorly as far as the hind margin of the eye; eyes large, prominent; antennæ less than one-half the length of the body, rufo-testaceous, the outer joints scarcely darker; palpi testaceous. Prothorax sub-quadrate, about one-half wider than long, scarcely narrower at base than apex; apex truncate; anterior transverse impression feeble or nearly obsolete; median line fine, abbreviated before and behind; posterior transverse impression distinct, punctate; basal impressions very small, feebly marked; base truncate; sides with the margin narrowly reflexed, arcuate in front, sinuate behind; hind angles rectangular, finely carinate. Elytra very slightly wider than the thorax, elongate, oblong-ovate, subparallel, with six moderately fine dorsal striæ; margin narrowly reflexed; striæ subentire, finely punctate, slightly less deeply towards the tip, the fifth slightly grooved at apex; intervals flat, the third with the first dorsal puncture about one-fourth from base, the second slightly behind the middle. Body beneath rufo-piceous or piceous, the head and thorax paler. Legs testaceous. Length .10-.13 inch; 2.5-3.25 mm.

Resembles the preceding most closely, but is abundantly distinct by its more parallel, subdepressed form and by the form of the thorax.

Although, by no means subopaque, the surface is less shining than in *ephippiatus*. Under high power it is seen to be very finely alutaceous, especially on the elytra, and a slightly pearly lustre is thus imparted.

It is known to me only from Arizona.

Group VII. lævus.

Head not inserted in the thorax to the eyes; mentum with two large, forameniform punctures behind the tooth. Thorax narrowly margined, the margin not translucent. Elytra rounded at tip, with two dorsal punctures on the third interval very close to the third stria; recurved portion of the sutural stria very short, not hooked at tip, apparently representing the apical end of the abbreviated third stria; marginal stria broadly interrupted at middle, obsolete in *lævus*, in which the marginal punctures assume unusual prominence.

In this group I have included three species, which agree in the above characters. Of these, the first (*trechiformis*) has the second

and third joints of the antennæ subequal, as in most species of *Tachys*, while in the other two the second joint is distinctly longer than the third. In *lævus* (Plate VI, fig. 14) the antennæ are almost moniliform, an approach to this form being seen in *rufotestaceous*, while in *trechiformis* they are of the form usually seen in the genus. Were the species more numerous the group might easily be divided into two on the structure of the antennæ, but as they are so few I cannot see that any advantage would be gained by so doing. All agree in having the dorsal punctures of the elytra on the third interval very close to the third stria, in fact, being so close in *trechiformis* as to appear rather like inward dilations of the stria itself. An elytron of *T. lævus* is shown on Plate VI, fig. 6.

The first two joints of the anterior tarsi are slightly dilated in the males.

The species may thus be separated:

Small species; antennæ with the second joint longer and stouter than the third; thorax narrower at base thax apex..... .....2.

Larger; antennæ with joints 2-3 subequal; elongate; rufo-testaceous; thorax as wide at base as apex, hind angles rectangular; striæ of elytra obsoletely punctulate. Length .11 inch.....**trechiformis** n. sp.

2. Pale rufo-testaceous; elongate; thorax with the sides sinuate behind, hind angles rectangular; striæ of elytra finely punctulate; marginal stria with the apical portion distinct, the basal represented by setigerous punctures. Length .06-.07 inch.....**rufotestaceus** n. sp.

Piceous, often more or less tinged with rufous; less elongate; thorax with the sides at most obsoletely sinuate behind, hind angles obtuse; striæ of elytra very fine, impunctate; marginal stria obsolete, represented by setigerous punctures. Length .05-.06 inch.....**lævus** Say.

24. **T. trechiformis** n. sp.—Form slender, elongate, sub-depressed. Color rufo-testaceous, shining. Head scarcely narrower than the thorax; frontal grooves short, extending posteriorly scarcely to the middle of the eye; eyes large and prominent; antennæ less than one-half as long as the body, rufo-testaceous, the second and third joints subequal; palpi testaceous, the last joint very small. Prothorax subquadrate, about one-half wider than long, as wide at base as apex; apex truncate; anterior transverse impression feeble, the posterior distinct, finely punctulate; median line fine, extending between the transverse impressions; basal impressions moderately deep; base truncate; sides with the margin very narrowly reflexed, arcuate in front, sinuate behind; hind angles rectangular, not carinate. Elytra elongate, oblong-elliptical, subparallel, slightly wider than the thorax, finely striate; striæ obsoletely punctulate, the three inner deeper, the fourth and fifth feeble, all but the sutural abbreviated towards the apex; marginal stria interrupted at middle, the basal and apical portions distinct; first dorsal puncture about one-third from base, the second about one-third from apex; intervals flat. Body beneath and legs pale rufotestaceous. Length .11 inch; 2.75 mm.

Very distinct from any species known to me. In facies it somewhat recalls a minute *Trechus*. The subulate palpi seem here to attain their greatest development, the last joint of the maxillary being almost obsolete, and that of the labial very small.

Described from a single male from the Verde River, Arizona, collected by the late Dr. H. G. Griffith, for which I am indebted to the kindness of Mr. Chas. Liebeck.

25. **T. rufotestaceus** n. sp.—Form elongate, depressed. Color pale rufotestaceous. Head as wide as the thorax at apex; frontal grooves short, deep, extending posteriorly scarcely to the middle of the eye; eyes moderately large, slightly flattened; antennæ less than one-half the length of the body, testaceous, the outer joints darker, the second longer than the third, joints 3–10 sub-equal, the eleventh longer and acute at tip; palpi testaceous. Prothorax very slightly narrower at base than apex, subquadrate, about one-half wider than long; apex truncate; transverse impressions distinct, the anterior strongly arcuate and distant from the apex, the posterior distinctly angulate at middle; median line distinct, extending between the transverse impressions; basal impressions small, distinct; base truncate, very slightly obliquely so each side; sides with the margin narrowly reflexed, arcuate in front, sinuate behind; hind angles rectangular, not carinate. Elytra oblong-ovate, about one-half wider than the thorax, with four dorsal striæ, the two inner deeper; striæ finely punctate, the outer ones abbreviated behind; marginal stria with the apical portion distinct, the basal obsolete and represented by the usual two marginal setigerous punctures; first dorsal puncture about one-third from base, the second about one-fourth from apex. Body beneath rufous or rufotestaceous. Legs testaceous. Length .06–.07 inch; 1.5–1.75 mm.

A very distinct little species. It resembles *lævus* in having the second joint of the antennæ longer than the third, but is easily recognizable by the characters above given.

It occurs in California and Arizona.

26. **T. lævus** Say (Pl. VI., fig. 6).—Form subdepressed. Color piceous, often more or less tinged with rufous. Head large, as wide as the thorax at apex; frontal grooves very short, almost punctiform; eyes moderate, slightly flattened; antennæ submoniliform, less than one-half as long as the body, piceous, the first two joints very pale testaceous, the second stouter and very distinctly longer than the third, joints 3 10 nearly equal, the eleventh much longer and acute at tip; palpi pale testaceous. Prothorax subquadrate, nearly twice as wide as long, slightly narrower at base than apex; apex truncate; transverse impressions distinct, the posterior deeper, the median line very fine or nearly obsolete, extending between them; basal impressions small, deep; base truncate, obliquely so each side; sides with the margin very narrowly reflexed, strongly arcuate in front, oblique, or at most obsoletely sinuate behind; hind angles obtuse, but not rounded, not carinate. Elytra oblong-ovate, about one-half wider than the thorax, with a sutural and from one to three abbreviated dorsal striæ, the latter very fine or nearly obsolete; striæ impunctate; marginal stria obsolete, repre-

sented near the humerus and towards the apex by the usual marginal setigerous punctures; first dorsal puncture about one-third from base, the second about one-fourth from apex. Body beneath piceous, the head and thorax usually paler. Legs testaceous, the femora sometimes darker. Length .05–.06 inch; 1.25–1.5 mm.

A very singular little species and the smallest in our fauna. The structure of the antennæ (Pl. VI, fig. 14) is very curious and unlike that seen in any other species, except *rufotestaceus*, which resembles it in having the second joint longer than the third. The marginal stria of the elytra is obsolete, being represented near the humerus and towards the apex by the usual setigerous punctures, which are to be seen along the margin in most species of *Tachys*, but the presence of which is often obscured by the depth of the marginal stria. In perfect examples of *lævus* the setæ proceeding from these punctures are seen to be unusually long.

It occurs throughout the more eastern portions of the country. Specimens have been seen from Canada, Massachusetts, New York, New Jersey, Pennsylvania, North Carolina, Michigan, Iowa, Missouri, Arkansas and Louisiana.

Group VIII. vittiger.

Form more or less depressed. Head not inserted in the thorax to the eyes; mentum with two deep, forameniform punctures behind the tooth; antennæ with the second and third joints subequal. Thorax narrowly margined, the margin not translucent. Elytra rounded at tip, with two dorsal punctures, the first on the third stria, when the latter is present, scarcely in front of the middle, the second at or slightly behind the tip of the recurved portion of the sutural stria, but never enclosed within it; striæ usually feebly marked, impunctate, the sutural only attaining the apex, the latter with the recurved portion parallel to the suture, or nearly so, and hooked at tip; marginal stria broadly interrupted at middle.

In the males the first two joints of the anterior tarsi are more or less dilated.

Most nearly allied to the next group, the only character separating them being the different position of the dorsal punctures. A short study of their position in the different species will, I think, convince one that, while in the present group they really belong on the third stria, in the one containing *proximus*, *corruscus*, etc., their situation is on the fourth interval. In those species in which the outer striæ are feeble or obsolete, the position of the second punc-

ture, with relation to the recurved portion of the sutural stria, that is whether or not it is enclosed within it, will indicate to which group the species should be referred. This is shown on Plate VI, figs. 7 and 8.

Our species are moderately numerous, and several resemble each other very closely. The following table, it is hoped, will assist in their determination:

Eyes large, prominent.....2.
Eyes smaller, less convex; pale yellowish-testaceous; thorax distinctly narrower at base than apex: elytra scarcely wider than the thorax, feebly or obsoletely striate. Length .08–.10 inch.....**mordax** Lec.
2. Thorax squarely truncate at base; legs pale.....3.
Thorax more or less obliquely truncate each side at base.....5.
3. Thorax slightly narrower at base than apex.....4.
Thorax very distinctly narrower at base than apex; head nearly black, thorax piceous or rufopiceous, elytra pale testaceous, with the suture slightly infuscate; form very elongate, subparallel; elytra scarcely wider than the thorax, which is slightly wider than long. Length .09–.10 inch **virgo** Lec..
4. Less elongate; pale rufotestaceous, the head and thorax scarcely darker; elytra slightly wider than the thorax, which is about one-half wider than long. Length .09–.11 inch.....**pallidus** Chaud.
Piceous or black, the elytra slightly wider than the thorax, with either a vitta varying in breadth and extending nearly to apex, or a subhumeral spot pale, or even entirely black; thorax with the sides slightly sinuate behind, hind angles rectangular. Length .09–.12 inch. **vittiger** Lec.
More robust; color varying from brownish to nearly black, the elytra often with a subhumeral and sometimes a subapical spot pale, the two rarely united to form a longitudinal vitta; elytra one-half wider than the thorax, which has the sides sinuate behind and the hind angles rectangular. Length .09–.12 inch.....**occultator** Casey.
5. Slightly broader than *vittiger;* color dark piceous or black, the elytra sometimes with a pale longitudinal vitta; thorax slightly narrower at base than apex, sides not sinuate behind, hind angles obtuse, but not rounded; elytra distinctly wider than the thorax; femora piceous or black, tibiæ and tarsi paler. Length .08–.10 inch.....**corax** Lec.
More elongate; color black; thorax more narrowed behind, sinuate in front of the hind angles, which are subrectangular; elytra scarcely wider than the thorax; legs pale. Length .09 inch.....**misellus** Laf.
Broader; color piceous, the elytra with the sutural region, especially towards the base, slightly tinged with rufous; thorax as wide at base as apex, the hind angles very obtuse and rounded; elytra about one-half wider than the thorax; legs pale. Length .09 inch..**bradycellinus** n. sp.

27. **T. mordax** Lec.—Form elongate, depressed. Color pale testaceous, shining. Head large, as wide as the thorax at apex; frontal grooves distinct, extending posteriorly behind the middle of the eye; eyes moderate, somewhat

flattened; antennæ about one-half as long as the body, testaceous; palpi testaceous. Prothorax subquadrate, nearly one-half wider than long, distinctly narrower at base than apex; apex truncate; anterior transverse impression obsolete, the posterior distinct; median line fine, abbreviated at each end; basal impressions small, moderately deep; base truncate; sides with the margin narrowly reflexed, arcuate in front, sinuate behind; hind angles rectangular, not carinate. Elytra scarcely wider than the thorax, subparallel, with the first, second and third striæ feebly impressed or nearly obsolete, the recurved portion of the sutural slightly oblique and very strongly hooked at tip; first dorsal puncture about the middle, the second at the tip of the recurved portion of the sutural stria. Body beneath and legs testaceous. Length .08-.10 inch; 2-2.5 mm.

Distinct from the others of the group by the smaller and less prominent eyes.

It was described by LeConte from the Valley of the Colorado River. Other specimens have been seen from California, Arizona and Salt Lake Valley, Utah.

28. **T. virgo** Lec. Form elongate, depressed. Head piceous or nearly black, prothorax piceous or rufopiceous, elytra very pale testaceous, with the suture and an ill-defined discal spot more or less infuscate. Head large, scarcely narrower than the thorax; frontal grooves extending posteriorly to the middle of the eye; eyes large, prominent; antennæ scarcely one-half as long as the body, testaceous, the outer joints slightly fuscous; palpi testaceous. Prothorax slightly wider than long, narrower at base than apex, subquadrate; apex truncate; median line very fine, abbreviated at each end; anterior transverse impression obsolete, the posterior distinct; basal impressions very small; base truncate; sides with the margin very narrowly reflexed, slightly rounded in front, sinuate behind; hind angles rectangular, not carinate. Elytra slightly wider than the thorax, elongate, subparallel, very finely striate, the two inner striæ deeper, the third and fourth nearly obsolete, the other dorsal striæ wanting; first dorsal puncture about the middle, the second at tip of the recurved portion of the sutural stria; intervals nearly flat. Body beneath piceous. Legs testaceous. Length .09-.10 inch; 2.25 2.5 mm.

Resembles most closely *pallidus* Chaud., but the thorax is more narrowed behind and the color of the head and thorax darker. The form is also more elongate, the thorax longer as compared with its width and the elytra narrower as compared with the thorax.

Known to me only from California.

29. **T. pallidus** Chaud.—Form elongate, depressed. Color pale yellowish-testaceous, the head and thorax slightly darker than the elytra, the latter more or less translucent. Head as wide as the thorax at apex; frontal grooves not deeply impressed, extending posteriorly to the middle of the eye; eyes large and prominent; antennæ less than one-half the length of the body, testaceous; palpi testaceous. Prothorax about one-half wider than long, subquadrate, slightly narrower at base than apex; apex nearly truncate; anterior transverse impression obsolete or nearly so; median line very fine, abbreviated at each end; poste-

rior transverse impression distinct; basal impressions small, distinct; base truncate; sides with the margin very narrowly reflexed, arcuate in front, oblique behind, distinctly sinuate in front of the hind angles, which are rectangular, not carinate. Elytra oblong-ovate, subparallel, slightly wider than the thorax, very finely striate; the two inner striæ usually deeper, the third and fourth feeble, the outer obsolete; first dorsal puncture about the middle, the second at the tip of the recurved portion of the sutural stria; intervals flat. Head and thorax beneath rufotestaceous, the abdomen piceous. Legs testaceous. Length .09–.11 inch; 2.25–2.75 mm.

This species bears a close resemblance in general facies to *T. mordax* Lec., but may be distinguished by its larger and more prominent eyes, and by the thorax less narrowed behind.

Described by Chaudoir from Texas. It is known to me from several localities in that State, and also from numerous points along the coast of New Jersey.

30. **T. occultator** Casey.—Form moderately elongate, subdepressed. Color varying from rufo-ferruginous to piceous, shining, the elytra usually slightly darker than the thorax, and often with a subhumeral blotch and a smaller submarginal spot about one-third from apex paler, the spots usually ill defined; inflexed portion of the elytra paler. Head as wide as the thorax at apex; frontal grooves distinct, extending backward behind the middle of the eye; eyes large, prominent; antennæ scarcely one-half as long as the body, piceous, the three basal joints paler; palpi rufous. Prothorax very slightly narrower at base than apex, about one-half wider than long, subquadrate; apex truncate; anterior transverse impression obsolete, the posterior distinct, finely punctulate; median line very fine or nearly obsolete, abbreviated at each end; basal impressions small, deep; base truncate; sides with the margin very narrowly reflexed, more widely towards the basal angles, arcuate in front, sinuate behind; hind angles rectangular, not carinate. Elytra about one-half wider than the thorax, oblong-ovate, with a sutural and two or three dorsal striæ; striæ impunctate, the sutural deeper, the others abbreviated at each end and becoming finer externally; first dorsal puncture about the middle, the second at the tip of the recurved portion of the sutural stria; intervals flat. Body beneath piceous or rufopiceous, the head and thorax usually somewhat paler. Legs testaceous. Length .09–.12 inch; 2.25–3 mm.

This species is subject to considerable variation in color. Captain Casey's type was evidently, from his description, slightly immature. Most specimens from the more northern portions of its range have the elytra unicolorous, rarely with faint traces of the paler markings noted above. These are usually well marked in examples from Florida, while in those known to me from Texas the two spots are united. Two specimens from Florida have the head and thorax rufo-ferruginous and the elytra piceous, but all these forms are connected by intergrades in the series before me.

It is known to me from various localities along the coast from New Jersey to Florida, and from Brownsville and Pt. Isabel, Texas (Wickham).

31. **T. vittiger** Lec. (Plate VI, fig. 7).—Form elongate, depressed. Color dark piceous or black, shining, the elytra, in typical examples, with a pale longitudinal vitta, which extends from near the humerus almost to apex, and is usually suddenly narrowed about one-fourth from base, in others reduced to a subhumeral spot or even entirely wanting, while in the form *marginellus* the vitta is very broad, extending from the third stria nearly to the margin. Head as wide as the thorax at apex; frontal grooves distinct, extending posteriorly to the middle of the eye; eyes large, prominent; antennæ less than one-half the length of the body, fuscous, the basal joints paler; palpi rufous, darker towards the tip. Prothorax subquadrate, rather more than one-half wider than long, slightly narrower at base than apex; apex truncate; anterior transverse impression obsolete, the posterior deep, finely punctulate; median line distinct, abbreviated before and behind; basal impressions small, deep; base truncate; sides with the margin very narrowly reflexed, arcuate, sinuate in front of the hind angles, which are rectangular and not carinate. Elytra slightly wider than the thorax, elongate, subparallel; striæ impunctate, the sutural deep, second and third very fine, the latter often nearly obsolete, fourth rarely discernable; first dorsal puncture about the middle, the second at the tip of the recurved portion of the sutural stria; intervals flat. Body beneath nearly black, shining. Legs yellowish testaceous. Length .09-.12 inch; 2.25-3 mm.

As indicated above, this species varies greatly in color, the form described as *marginellus* by LeConte being at first sight very distinct from that in which the elytral vitta is entirely wanting, but in a large series all intergrades occur.

It resembles quite closely *T. corax*, the two being very often confused in collections. From the latter species it may be distinguished by the thorax squarely truncate at base, with the sides sinuate in front of the hind angles, which are rectangular. The second dorsal puncture of the elytra is always situated at the tip of the recurved portion of the sutural stria, not between it and the apex as in *corax*.

It occurs along the Pacific Coast from California to Vancouver Island. The form *marginellus* was described by LeConte from the Valley of the Colorado River, about thirty miles from the sea.

32. **T. corax** Lec.—Form depressed. Color black or dark piceous, shining, the elytra sometimes with a pale longitudinal vitta, usually less clearly defined than in *vittiger*, very finely or scarcely perceptibly alutaceous. Head as wide as the thorax at apex; frontal grooves distinct, extending posteriorly as far as the middle of the eye; eyes large, prominent; antennæ less than one-half the length of the body, piceous, the basal joints somewhat paler; palpi piceous. Prothorax about one-half wider than long, very slightly narrower at base than apex; apex truncate; anterior transverse impression obsolete, the posterior distinct, close to

the base; median line fine, abbreviated at each end; basal impressions small, deep; base truncate, slightly obliquely so each side; sides with the margin very narrowly reflexed, arcuate in front, oblique behind; hind angles obtuse, but not rounded, not carinate. Elytra wider than the thorax, oblong-ovate, with a sutural and two or three dorsal striæ very fine, impunctate, the former deeper towards the apex, with the recurved portion strongly hooked at tip, the third and fourth usually very feebly impressed or nearly obsolete; first dorsal puncture near the middle, the second slightly behind the tip of the recurved portion of the sutural stria; intervals flat. Body beneath dark piceous or black. Legs with the femora varying from more or less piceous to nearly black, the tibiæ and tarsi paler. Length .08–.10 inch; 2–2.5 mm.

It is very closely allied to the preceding, and the two species exhibit nearly parallel series of color variations. Examples of *corax* with the elytra longitudinally vittate have the vitta less clearly defined than in typical specimens of *vittiger*. As in the latter species examples occur with a subhumeral and subapical spot or even only a subhumeral spot pale, so that the black and vittate forms are connected by intergrades. The latter seems confined to the more eastern portions of its range. Nearly similar varitions in color are also to be seen in *occultator*. From *vittiger* it may be recognized by the thorax slightly obliquely truncate each side at base, with the sides oblique, not sinuate behind and the hind angles obtuse, as well as by the color of the legs. The latter character, together with its less elongate form, with the thorax less narrowed behind, seems sufficient to separate it from *misellus*.

It occurs in Upper and Lower California, Arizona, New Mexico, Utah, Montana, Colorado, Nebraska and Texas. A specimen from Colorado in Mr. Ulke's collection was taken at an altitude of 10,000 ft.

33. **T. misellus** Laf.—Form slender, elongate, slightly depressed. Color nearly black, shining. Head as wide as the thorax at apex; frontal grooves distinct, extending posteriorly to the middle of the eyes, which are large and prominent; antennæ less than one-half as long as the body, piceous, the basal joints testaceous; palpi testaceous. Prothorax subquadrate, nearly twice as wide as long, distinctly narrower at base than apex; apex truncate; anterior transverse impression obsolete, the posterior feebly marked; median line scarcely evident; basal impressions small; base truncate, slightly obliquely so each side; sides with the margin narrowly reflexed, arcuate, sinuate in front of the hind angles, which are subrectangular, not carinate. Elytra scarcely wider than the thorax, subparallel; sutural and second stria very fine, the third nearly obsolete; first dorsal puncture scarcely in front of the middle, the second slightly behind the tip of the recurved portion of the sutural stria. Legs yellowish testaceous. Length .09 inch; 2.25 mm.

Most nearly allied to *corax*, which it closely resembles, but from

which it differs by the thorax more narrowed behind, its more slender form, and the entirely pale legs. The only specimen known to me is so mounted that the greater part of the under side is invisible.

Described from one rather mutilated example in the LeConte collection, received presumably from Chaudoir, but without locality label.

The species was described by Laferté from Texas.

34. **T. bradycellinus** n. sp.—Form broad, subdepressed. Color piceous, shining, the elytra with the sutural region, especially towards the base, tinged with rufous, the paler color not clearly defined. Head as wide as the thorax at apex; frontal grooves distinct, extending behind the middle of the eye; eyes large and prominent; antennæ nearly one-half the length of the body, rufotestaceous; palpi rufotestaceous. Prothorax as wide at base as apex, subquadrate, rather more than one-half wider than long; apex truncate; anterior transverse impression obsolete, the posterior deep; median line fine, abbreviated before and behind; basal impressions small, deep; base truncate, obliquely so each side; sides with the margin narrowly reflexed, feebly arcuate in front, slightly oblique behind; hind angles very obtuse and rounded, not carinate. Elytra about one-half wider than the thorax, oblong-ovate, with four dorsal striæ, the two inner deeper, the third and fourth nearly obsolete; sutural stria deeper behind; striæ impunctate; first dorsal puncture about the middle, the second behind the tip of the recurved portion of the sutural stria. Body beneath piceous, the thorax and inflexed portion of the elytra tinged with rufous. Legs testaceous. Length .09 inch; 2.25 mm.

Described from an unique, which I owe to the generosity of my friend, Mr. F. C. Bowditch. The resemblance to a small *Bradycellus*, in miniature, is quite marked.

The type, which is a male, is from Louisiana.

Group IX. proximus.

Form usually more or less depressed, rarely slightly convex. Head not inserted in the thorax to the eyes; mentum with two large, forameniform punctures behind the tooth; antennæ with the second and third joints subequal or nearly so, the second joint sometimes very slightly longer than the third; frontal grooves distinct, extending posteriorly at least as far as the middle of the eye. Prothorax narrowly margined, the margin not translucent. Elytra rounded at tip, with the first dorsal puncture on the fourth interval in front of the middle, the second near the apex enclosed within the recurved portion of the sutural stria, which is nearly parallel to the suture and is hooked at tip; marginal stria broadly interrupted at middle, the apical portion distinct, the basal usually obsolete or nearly so and represented by punctures.

The species of this group divide themselves naturally into two series based upon the number of dilated tarsal joints in the males. In the first the two basal joints of the anterior tarsi are slightly dilated; in the second the first joint only. This is shown on Plate VI, figs. 15 and 16 Figure 16, however, represents the tarsus of *T. corruscus*, in which the inner angle of the dilated basal joint is more prolonged than in the other species.

It is greatly to be regretted that I have been obliged to derive the character for the primary division of the group from the secondary sexual characters of the male, more especially as specimens of that sex are much rarer than the females in the majority of our species.

The essential character separating the present from the preceding group is derived from the position of the dorsal punctures of the elytra. In the species herein contained the first of these is situated on the fourth interval, the second within the recurved portion of the sutural stria not far from its tip. In the eighth group their position is very different, the first being placed on the third stria, while the second is situated either at or slightly behind the tip of the recurved portion of the sutural stria, but never enclosed within it. This is shown on Plate VI, figs. 7 and 8. In specimens in which the third and fourth striæ are obsolete the position of the second puncture will indicate to which group the species should be referred.

I regard this as the most difficult group of the genus for study. Several species resemble each other very closely, while some are very variable, especially in color, the extreme forms bearing a greater resemblance to species separated by good structural characters than to other varieties which can be connected with them by a perfect series of intergrades

The following table is the best that I have been able to devise for the separation of our species. One of these, *T. sequax*, is not included therein, the male being unknown to me, but a description of the species is given below. Reference should be made in all cases to the descriptions, which follow in what seems to be the best order for cabinet arrangement.

Males with the first two joints of the anterior tarsi dilated.....2.
Males with only the basal joint of the anterior tarsi dilated.....5.
2. Elytra nearly oval, sides strongly arcuate; form slightly convex.....3.
Elytra oblong-oval; form more or less depressed.....4.
3. Large species; piceous or nearly black, the elytra finely alutaceous with more or less silken lustre; sides of thorax oblique behind, hind angles very obtuse, nearly obsolete. Length .12–.13 inch.....**albipes** Lec.

Smaller; head and thorax brownish, elytra darker, shining; sides of thorax oblique behind, at most feebly sinuate in front of the hind angles, which are obtuse, but slightly prominent. Length .09–.10 inch. **ventricosus** Lec.

4. Elongate; head and thorax piceous or rufo-piceous, the latter rarely paler, elytra testaceous, usually with an ill-defined discal cloud behind the middle; thorax about one-half wider than long, sides more or less sinuate behind, hind angles subrectangular; elytra usually with the two inner striæ distinct, the others feeble or nearly obsolete. Length .11–.13 inch..... **proximus** Say.

Broader; testaceous; thorax twice as wide as long, sides not sinuate behind, hind angles obtuse, slightly rounded; elytra more than one-half wider than the thorax. Length .12 inch..... **latipennis** n. sp.

5. Males with the basal joint of the anterior tarsi normally dilated.....6.

Males with the inner angle of the dilated basal joint of the anterior tarsi prolonged in a spiniform process.....9.

6. Prothorax as wide at base as apex.....7.

Prothorax narrower at base than apex.....8.

7. Form nearly as in *proximus;* color usually more reddish, the discal cloud better defined and extending to the sides; thorax rarely darker than the elytra, nearly twice as wide as long, sides at most obsoletely sinuate behind, hind angles obtuse; elytra usually more deeply striate. Length .10–.12 inch..... **scitulus** Lec.

Smaller; testaceous, the head and sometimes the elytra darker; thorax nearly twice as wide as long, sides not sinuate behind. Length .07–.09 inch. **vorax** Lec.

Elongate; testaceous, the elytra often with faint, ill-defined discal cloud or rarely rufo-piceous; thorax about one-half wider than long, sides sinuate behind, hind angles obtuse. Length .07–.09 inch... **pumilus** Dej.

8. Slender; piceous or nearly black; sides of thorax distinctly sinuate behind, hind angles obtuse, but slightly prominent; elytra with at least the two inner striæ distinct. Length .07–.08 inch..... **edax** Lec.

Head piceous, thorax yellow, elytra brownish, the latter subopaque; sides of thorax oblique behind; hind angles obtuse; elytra with the sutural stria only distinct. Length .09–.10 inch..... **columbiensis** n. sp.

9. Moderately elongate, subdepressed; color varying from piceous to dark rufo-testaceous; thorax one-half wider than long, as wide at base as apex, sides at most obsoletely sinuate behind, hind angles obtuse. Length .09–.11 inch..... **corruscus** Lec.

35. **T. albipes** Lec.—Form elongate, very slightly convex. Color piceous or nearly black, shining, the elytra alutaceous, usually slightly iridescent, with more or less silken lustre. Head as wide as the thorax at apex; eyes large and prominent; antennæ nearly one-half the length of the body, fuscous; palpi rufous. Prothorax subquadrate, as wide at base as apex, nearly twice as wide as long; apex nearly truncate; anterior transverse impression nearly obsolete, the posterior deep; median line fine, abbreviated at each end; basal impressions small; base truncate, obliquely so each side; sides with the margin narrowly reflexed, arcuate in front, oblique behind; hind angles very obtuse, nearly obliterated, not carinate. Elytra nearly oval, about one-half wider than the thorax,

with a sutural and two or three dorsal striæ, the sutural deeper behind, the outer ones feeble or nearly obsolete; first dorsal puncture about one-third from base, the second about one-fifth from apex. Body beneath piceous. Legs testaceous. Length .12–.13 inch; 3–3.25 mm.

In the males the first two joints of the anterior tarsi are dilated.

Most closely allied to *ventricosus*, but abundantly distinct by the characters given above. The silken lustre on the elytra is very marked in most examples seen, and is apparently due to their being finely alutaceous.

It seems to be confined to the extreme southern portions of the country, being known to me only from Florida and Louisiana.

36. **T. ventricosus** Lec.—Form slightly convex. Head and thorax brown, slightly reddish, the elytra darker; surface shining. Head as wide as the thorax at apex; eyes large and prominent; antennæ about one-half as long as the body, fuscous, slightly paler at each end; palpi rufo-testaceous. Prothorax subquadrate, about one-half wider than long, slightly narrower at base than apex; apex truncate; median line fine, extending between the transverse impressions, which are distinct, the posterior deeper; basal impressions small; base truncate, obliquely so each side; sides with the margin very narrowly reflexed, arcuate in front, oblique behind, rarely very feebly sinuate in front of the hind angles, which are obtuse, but not rounded, not carinate. Elytra nearly oval, about one-half wider than the thorax, the sutural stria deeper behind, the second moderately distinct, the others nearly effaced; striæ impunctate; dorsal punctures distinct, the first about one-third from base, the second about one-fifth from apex. Head and thorax beneath reddish brown, the abdomen more or less piceous. Legs testaceous. Length .09–.10 inch; 2.25–2.5 mm.

The first two joints of the anterior tarsi are dilated in the males.

Smaller and more robust than the preceding. The color is also different, and no trace is visible of the silken lustre so marked in *albipes*. The hind angles of the thorax are somewhat prominent, although obtuse. On the whole it is one of the best defined species of the group.

T. oopterus Chaud. is synonymous with this species.

Like the preceding it is confined to the extreme Southern States. It occurs in Louisiana and Florida.

37. **T. latipennis** n. sp.—Form broad, depressed. Color rufo-testaceous, shining, thorax slightly paler. Head as wide as the thorax at apex; eyes large and prominent; antennæ less than one-half as long as the body, testaceous; palpi testaceous. Prothorax twice as wide as long, as wide at base as apex, subquadrate; apex truncate; median line fine, extending between the transverse impressions, the anterior of which is nearly obsolete, the posterior distinct; basal impressions small; base truncate, obliquely so each side; sides with the margin very narrowly reflexed, arcuate in front, oblique behind; hind angles very obtuse, slightly rounded, not carinate. Elytra oblong-ovate, more than one-half wider than the

thorax, finely alutaceous, with the first four striæ discernable, the two inner deeper, the third and fourth feebly impressed; sutural stria deeper behind; striæ impunctate; dorsal punctures distinct, the first about one-third from base, the second about one-fifth from apex. Body beneath rufo-testaceous. Legs testaceous. Length .12 inch; 3 mm.

The anterior tarsi have the first two joints distinctly dilated in the male.

It is known to me by a single pair in the Horn collection. They were sent to Dr. Horn under the name "*pallidus* Chd.," but the different arrangement of the dorsal punctures forbids any association with that species. In facies it resembles most nearly *vorax* Lec., but is larger and broader, and differs also in the tarsal characters of the male.

The specimens above mentioned are from San Estaban, Lower California.

38. **T. proximus** Say (Plate VI, fig. 8).—Form elongate, subdepressed. Head and thorax piceous, rarely tinged with rufous, the elytra testaceous, with an ill-defined discal cloud slightly behind the middle dusky; surface shining, the elytra with more or less silken lustre. Head as wide as the thorax at apex; eyes large, prominent; antennæ nearly one-half the length of the body, pale fuscous, the basal joint testaceous; palpi testaceous. Prothorax subquadrate, as wide at base as apex, about one-half wider than long; apex truncate; anterior transverse impression nearly obsolete, the posterior deep; median line distinct, abbreviated before and behind; basal impressions distinct; base truncate, obliquely so each side; sides with the margin very narrowly reflexed, arcuate in front, sinuate behind; hind angles subrectangular, not carinate. Elytra oblong-oval, elongate, with the two or three inner striæ distinct, the others feeble or nearly obsolete, the sutural deeper behind; first dorsal puncture about one-third from base, the second about one-fifth from apex. Body beneath piceous, the thorax slightly tinged with rufous. Legs testaceous. Length .11-.13 inch; 2.75-3.25 mm.

The males have the first two joints of the anterior tarsi dilated (Plate VI, fig. 15).

Quite easily recognizable from all the other species of the group except *scitulus*, which it resembles so closely that without both sexes at hand it is often very difficult to separate them. The essential difference between the two species is afforded by the tarsal characters of the male. A few comparative differences may be enumerated, which are usually of assistance in identifying specimens. The thorax in *proximus* is longer as compared with its width, with the sides more or less sinuate behind, and, as a consequence, the hind angles are less obtuse and more prominent. The form is slightly more elongate and less depressed. In color the head and thorax

are usually darker than the elytra in the present species, while the discal cloud, which is usually to be seen on the elytra, is in most examples less defined and less transverse, rarely, if ever, attaining the margin.

It occurs from the New England States southward to North Carolina and westward to Nebraska.

39. **T. scitulus** Lec.—Form depressed, slightly elongate. Color rufo-testaceous, the head and rarely the thorax darker, the elytra with a more or less distinct transverse band behind the middle fuscous or piceous; surface shining, usually very finely alutaceous, especially the elytra. Head as wide as the thorax at apex; eyes large, prominent; antennæ scarcely one-half the length of the body, fuscous, the basal joints paler; palpi testaceous. Prothorax as wide at base as apex, subquadrate, nearly twice as wide as long; apex truncate; anterior transverse impression fine, the posterior deep; median line distinct, limited at each end by the transverse impressions; basal impressions distinct; base truncate, obliquely so each side; sides with the margin narrowly reflexed, arcuate in front, oblique behind, rarely obsoletely sinuate in front of the hind angles; hind angles obtuse, but not rounded, not carinate. Elytra oblong-ovate, about one-half wider than the thorax, finely striate, usually with the four or five inner striæ distinct; striæ impunctate, the sutural deeper behind, the second subentire; first dorsal puncture about one-third from base, the second about one-fifth from apex. Body beneath rufo-testaceous. Legs testaceous. Length .10–.12 inch; 2.5–3 mm.

The males are rare as compared with the females. In the former only the basal joint of the anterior tarsi is dilated.

This species resembles *proximus* very closely, and is often confused with it in collections. Aside from the difference in the anterior tarsi of the males, the several distinguishing characters may be mentioned. The prothorax is proportionally wider as compared with its length, with the sides at most obsoletely sinuate behind and the hind angles more obtuse and less prominent. The form is slightly less elongate and more depressed, and the color usually more reddish, with the discal spot of the elytra better defined and more transverse and frequently extending to the margin.

Its range of distribution is nearly the same. Specimens are known to me from Massachusetts, New York, New Jersey, Pennsylvania, the District of Columbia, North Carolina, Indiana, Iowa, Missouri, Kansas and Texas.

40. **T. vorax** Lec.—Moderately elongate, depressed. Color fusco-testaceous, the head and sometimes the elytra darker. Head as wide as the thorax at apex; eyes large, prominent; antennæ about one-half as long as the body, testaceous, the outer joints slightly fuscous; palpi testaceous. Prothorax nearly twice as wide as long, subquadrate, as wide at base as apex; apex truncate; anterior

transverse impression nearly obsolete, the posterior distinct; median line very fine, scarcely distinct, abbreviated at each end; basal impressions small; base truncate, slightly obliquely so each side; sides with the margin narrowly reflexed, arcuate in front, oblique behind; hind angles obtuse, but not rounded, not carinate. Elytra about one-half wider than the thorax, oblong-ovate, with the two inner striæ fine but distinct, the third and fourth nearly obsolete; first dorsal puncture about two-fifths from base, the second about one-fifth from apex. Body beneath fuscous. Legs pale yellowish testaceous. Length .07 .09 inch; 1.75–2.25 mm.

The first joint of the anterior tarsi is dilated in the males.

Often confused with *pumilus*, but distinguishable by the characters above given.

It occurs in California, extending eastward through Arizona and New Mexico to Texas.

41. **T. pumilus** Dej.—Form elongate, depressed. Color usually ferrugineous or rufo-testaceous, the head and often a very ill-defined discal cloud on the elytra or more rarely the entire elytra darker; surface shining. Head as wide as the thorax at apex; eyes moderately large and prominent; antennæ nearly one-half as long as the body, fuscous, the basal joints testaceous; palpi testaceous. Prothorax subquadrate, as wide at base as apex, about one-half wider than long; apex truncate; anterior transverse impression rather feeble, the posterior deep; median line distinct, extending between the transverse impressions; basal impressions small; base truncate, slightly obliquely so each side; sides with the margin very narrowly reflexed, arcuate in front, oblique behind, slightly sinuate in front of the hind angles, which are slightly obtuse, but moderately prominent, not carinate. Elytra oblong-ovate, subparallel, slightly wider than the thorax, the number of striæ variable, usually with the sutural and the two or three inner ones distinct, often obsoletely punctulate; dorsal punctures distinct, the first about one-third from base, the second about one-third from apex. Body beneath ferrugineous or rufo-piceous. Legs testaceous. Length .07 .09 inch; 1.75–2.25 mm.

Only the first joint of the anterior tarsi is dilated in the males.

Resembles most nearly *T. vorax*. The form, however, is more elongate, with the sides of the thorax at least feebly sinuate behind and the hind angles consequently more prominent. Some variation is seen in the number and depth of the elytral striæ and in the depth of the sinuation of the sides of the thorax. The color also varies as indicated above.

It occurs in Louisiana and Texas. A few specimens, which seem referable to this species, have also been seen from Yuma, Cal.

42. **T. edax** Lec.—Form slender, elongate, depressed. Color piceous or nearly black, shining. Head as wide as the thorax at apex; eyes large, prominent; antennæ scarcely one-half the length of the body, piceous, the basal joint paler; palpi fuscous. Prothorax subquadrate, about one-half wider than long, narrower at base than apex; apex truncate; anterior transverse impression obso-

lete, the posterior deep; median line distinct, abbreviated before and behind; basal impressions distinct; base truncate, obliquely so each side; sides with the margin narrowly reflexed, arcuate in front, sinuate behind; hind angles slightly obtuse, not carinate. Elytra oblong-ovate, slightly wider than the thorax, somewhat variably striate, the two inner striæ deeper, the outer usually obsolete or nearly so, more rarely with the third and even the fourth well marked; striæ impunctate; dorsal punctures rather large, the first about one-third from base, the second about one-fifth from apex. Body beneath piceous. Legs testaceous. Length .07–.09 inch; 1.75–2.25 mm.

In the males only the basal joint of the anterior tarsi is dilated.

One of the best-marked species of the group.

It occurs in California, Oregon, Nevada, Idaho and Utah.

43. **T. columbiensis** n. sp.—Form elongate, depressed. Head piceous, thorax yellow, elytra reddish brown, the latter subopaque, with more or less silken lustre. Head as wide as the thorax at apex; eyes large and prominent; antennæ about one-half as long as the body, fuscous, the basal joints yellowish testaceous; palpi yellowish testaceous. Prothorax subquadrate, narrower at base than apex, about one-half wider than long; apex truncate; transverse impressions distinct, the median line fine, extending between them; basal impressions very small; base truncate, obliquely so each side; sides arcuate in front, oblique behind, the margin very narrowly reflexed; hind angles obtuse, but not rounded, not carinate. Elytra oblong-ovate, subparallel, slightly wider than the thorax; striæ impunctate, the sutural distinct, deeper posteriorly, the second and third feeble or obsolete; dorsal punctures distinct, the first about one-third from base, the second about one-fifth from apex. Body beneath rufo-piceous, the thorax yellowish. Legs yellowish testaceous. Length .09–.10 inch; 2.25–2.5 mm.

The first joint of the anterior tarsi is dilated in the male.

The name above used is a manuscript one employed in both the LeConte and Zimmermann collections. It seems best to retain it, especially as many specimens have been distributed under that name by Dr. LeConte, and it also occasionally occurs in our literature.

From *corruscus*, to which it seems most nearly allied, it may be distinguished by the thorax narrower at base than apex, and by the more oblong elytra, which are narrower as compared with the thorax. In the male the basal joint of the anterior tarsi is normally dilated, the inner angle not being prolonged in a spiniform process as in the latter species.

It is known to me from South Carolina and Florida.

44. **T. corruscus** Lec.—Form subdepressed. Color varying from nearly black to piceous or more rarely dark rufo-testaceous, the elytra sometimes feebly iridescent. Head as wide as the thorax at apex; eyes large, prominent; antennæ scarcely one-half as long as the body, fuscous, the basal joint testaceous; palpi testaceous. Prothorax subquadrate, about one-half wider than long, as wide at base as apex; apex truncate; anterior transverse impression feeble or nearly obsolete; median line fine, abbreviated at each end; posterior transverse impression

deep; basal impressions distinct; base truncate, obliquely so each side; sides with the margin narrowly reflexed, arcuate in front, oblique behind, sometimes obsoletely sinuate in front of the hind angles, which, though obtuse, are in that case made slightly prominent; hind angles not carinate. Elytra about one-half wider than the thorax, oblong-oval, with a sutural and from one to three dorsal striæ, the latter feebly impressed or nearly obsolete; striæ impunctate, the sutural deeper posteriorly; first dorsal puncture about one-third from base, the second about one-fifth from apex. Body beneath piceous, sometimes tinged with rufous. Legs testaceous. Length .09 .11 inch; 2.25–2.75 mm.

Only the basal joint of the anterior tarsi is dilated in the males, but the inner angle is prolonged in a spiniform process, which, so far as known to me, is peculiar to this species. This is shown on Plate VI, fig. 16.

This is one of our most abundant representatives of the genus, and is subject to considerable variation. Some specimens have the head and elytra very finely alutaceous, a silken or faintly iridescent lustre being thus imparted to the latter, but this disappears by degrees in a large series. The color varies as indicated above, as a rule examples from the more western postions of its range being paler than those from the extreme eastern regions, but many exceptions occur. In dark specimens the extreme tip of the elytra is usually very slightly paler. The reverse is sometimes seen in pale examples, the disk in such being often paler than the margins and tip.

It is very widely distributed, occurring along the Atlantic coast from Massachusetts to Florida and westward to the Rocky Mts., and also in Canada.

45. **T. sequax** Lec.—Slender, elongate, feebly convex. Head and thorax rufo-piceous, elytra testaceous. Head as wide as the thorax at apex; eyes moderately large and prominent; antennæ less than one-half the length of the body, pale fuscous, the basal joints testaceous; palpi testaceous. Prothorax subquadrate, twice as wide as long, slightly narrower at base than apex; apex truncate; anterior transverse impression feeble, the posterior deep, the median line fine, extending between them; basal impressions small; base truncate, obliquely so each side; sides with the margin narrowly reflexed, arcuate, sinuate in front of the hind angles, which are slightly obtuse, but prominent, not carinate. Elytra elongate, slightly wider than the thorax; sutural stria deeper behind, impunctate, the other dorsal striæ nearly obsolete; dorsal punctures distinct. Body beneath rufo-piceous. Legs pale testaceous. Length .10 inch; 2.5 mm.

Dr. LeConte's type is the only example known to me. It is a female, and it is therefore impossible to know its affinities as indicated by the tarsal characters of the male. It resembles most closely *T. corruscus*, but differs by its more elongate and slightly more convex form and by the form of the thorax.

It was described from the Rocky Mts.

Bibliography and Synonymy.

TACHYS Schaum.

Group I.

1. T. ænescens Lec., Ann. Lyc., 1848, iv, p. 473 (*Blemus*); Class. Col. N. A., i, 1863-6, p. 36.—Mots., Etud. Ent., 1862, xi, p. 27 (*Lymnastis*).—Chaud., Rev. et Mag. Zool., 1868, Sér. 2, xx, p. 211 (*Lymnastis*).

Group II.

2. T. nanus Gyll., Ins. Suec., 1810, ii, p. 30 (*Bembidium*).—Dej., Spec., 1831, v, p. 51 (*Bembidium*).
   inornatus Say, Trans. Am. Phil. Soc., 1823, ii, p. 88 (*Bembidium*); Ed. Lec., ii, p. 502.—Dej., Spec., 1831, v, p. 52 (*Bembidium*).—Lec., Ann. Lyc., 1848, iv, p. 471.—Mots., Etud. Ent., 1862, xi, p. 27 (*Tachymenis*).
   picipes Kirby, Faun. Bor. Am., 1837, iv, p. 56, tab. 8, fig. 6 (*Tachyta*).
   rivularis Mots., Kaf. Rus., 1850, p. 8, not. 2; Bull. Mosc., 1859, xxxii, p. 123; Etud. Ent., 1862, xi, p. 27 (*Tachymenis*).—Mann., Bull. Mosc., xxvi, 1853, p. 152.
3. T. falli n. sp.

Group III.

4. T. flavicauda Say, Trans. Am. Phil. Soc., 1823, ii, p. 87 (*Bembidium*); Ed. Lec., ii, p. 502.—Dej., Spec., 1831, v, p. 53 (*Bembidium*).—Lec., Ann. Lyc., 1848, iv, p. 471.—Mots., Etud. Ent., 1862, xi, p. 27 (*Tachymenis*).
   apicalis Sturm., Cat., 1843, p. 36.

Group IV.

5. T. granarius Dej., Spec., 1831, v, p. 61 (*Bembidium*).—Chaud., Rev. et. Mag. Zool., 1868, Sér. 2, xx, p. 214.
   occultus Lec., Ann. Lyc., 1848, iv, p. 470.
   glossema Casey, Cont. Col., pt. ii, 1885, p. 70 (*Barytachys*).
6. T. fuscicornis Chaud., Rev. et Mag. Zool., 1868, Sér. 2, xx, p. 214.
   gemellus Casey, Cont. Col., pt. ii, 1885, p. 71 (*Barytachys*).
7. T. incurvus Say, Trans. Am. Phil. Soc., 1834, iv, p. 440 (*Bembidium*); Ed. Lec., ii, p. 554.—Mots., Etud. Ent., 1862, xi, p. 27 (*Tachyura*).—Chaud., Rev. et Mag. Zool., 1868, Sér. 2, xx, p. 213.
   pulchellus ‡ Lec., Ann. Lyc., 1848, iv, p. 469.
   anceps Lec., ibid, p. 470.
8. T. dolosus Lec., Ann. Lyc., 1848, iv, p. 470.—Mots., Etud. Ent., 1862, xi, p. 27 (*Tachyura*).
9. T. rapax Lec., Ann. Lyc., 1851-2, v, p. 192.
10. T. audax Lec., Ann. Lyc., 1851-2, v, p. 193.
11. T. anthrax Lec., Ann. Lyc., 1851-2, v, p. 192.
12. T. nebulosus Chaud., Rev. et Mag. Zool., 1868, Sér. 2, xx, p. 214.
    incurvus ‡ Lec., Ann. Lyc., 1848, iv, p. 469.
13. T. liebecki n. sp.
14. T. xanthopus Dej., Spec., 1831, v, p. 60 (*Bembidium*).—Lec., Ann. Lyc., 1848, iv, p. 469.—Mots., Etud. Ent., 1862, xi, p. 27 (*Tachyura*).
    mendax Lec., Ann. Lyc., 1848, iv, p. 469.

15. T capax Lec., New Species, 1863-6, p. 20.
16. T. vivax Lec., Ann. Lyc., 1848, iv, p. 468.—Mots., Etud. Ent., 1862, xi, p. 27 (*Tachyura*).
17. T. tripunctatus Say, Trans. Am. Phil. Soc., 1834, iv, p. 439 (*Bembidium*); Ed. Lec., ii, p. 554.—Lec., Ann. Lyc., 1848, iv, p. 469.
18. T. obesulus Lec., Ann. Lyc., 1851-2, v, p. 192.
19. T. ferrugineus Dej., Spec., 1831, v, p. 59 (*Bembidium*).
    ovipennis Chaud., Rev. et Mag. Zool., 1868, Sér. 2, xx, p. 215.
    truncorum Hald., Mss.

Group V.

20. T. frontalis n. sp.

Group VI.

21. T. sellatus Lec., Ann. Lyc., 1851-2, v, p. 191 (*Pericompsus*).
22. T. ephippiatus Say, Trans. Am. Phil. Soc., 1834, iv, p. 439 (*Bembidium*); Ed. Lec., ii, p. 553 (*Pericompsus*).—Lec., Ann. Lyc., 1848, iv, p. 468; ibid, 1851-2, v, p. 191 (*Pericompsus*).
    elegantulus Laf., Rev. Zool., 1841, p. 46.
    mundissimus Zimm., Mss.
23. T. lætulus Lec., Ann. Lyc., 1851-2, v, p. 192 (*Pericompsus*).

Group VII.

24. T. trechiformis n. sp.
25. T. rufotestaceus n. sp.
26. T. lævus Say, Trans. Am. Phil. Soc., 1823, ii, p. 88 (*Bembidium*); Ed. Lec., ii, p. 503.—Lec., Ann. Lyc., 1848, iv, p. 472.
    troglodytes Dej., Spec., 1831, v, p. 44 (*Bembidium*).

Group VIII.

27. T. mordax Lec., Ann. Lyc., 1851-2, v, p. 193.
28. T. virgo Lec., Ann. Lyc., 1851-2, v, p. 194.
29. T. pallidus Chaud., Rev. et Mag. Zool., 1868, Sér. 2, xx, p. 212.
    litoralis Casey, Cont. Col., pt. i, 1884, p. 15.
30. T. occultator Casey, Cont. Col., pt. ii, 1885, p. 69.
31. T. vittiger Lec., Ann. Lyc., 1851-2, v, p. 193.
    marginellus Lec., ibid, p. 193.
32. T. corax Lec., Ann. Lyc., 1851-2, v, p. 194.
33. T. misellus Laf., Rev. Zool., 1841, p. 48.
34. T. bradycellinus n. sp.

Group IX.

35. T. albipes Lec., New Species, 1863-6, p. 20.
36. T. ventricosus Lec., New Species, 1863-6, p. 20.
    oopterus Chaud., Rev. et Mag. Zool., Sér. 2, xx, p. 212.
37. T. latipennis n. sp.
38. T. proximus Say, Trans. Am. Phil. Soc., 1823, ii, p. 88 (*Bembidium*); Ed. Lec., ii, p. 503.—Lec., Ann. Lyc., 1848, iv, p. 471.

39. T. scitulus Lec., Ann. Lyc., 1848, iv, p. 471.—Mots., Etud. Ent., 1862, xi, p. 27.
40. T. vorax Lec., Ann. Lyc., 1851–2. v, p. 194.
41. T. pumilus Dej., Spec., 1831, v, p. 43 (*Bembidium*).
umbripennis Chaud., Rev. et Mag. Zool., 1868, Sér. 2, xx, p. 213.
42. T. edax Lec., Ann. Lyc., 1851–2, v, p. 194.
43. T. columbiensis (Zimm. Mss.), n sp.
44. T. corruscus Lec., Ann. Lyc., 1848, iv, p. 472.—Mots., Etud. Ent., 1862, xi, p. 27 (*Polyderis*).—Chaud., Rev. et Mag. Zool., 1868, Sér. 2, xx, p. 211.
æneipennis Chaud., Rev. et Mag. Zool., 1868, Sér. 2, xx, p. 211.
45. T. sequax Lec., Ann. Lyc., 1848, iv, p. 472.

APPENDIX.

It has been thought best to follow the course adopted in my paper on *Bembidium* and here include the original descriptions of those species which have been described from North America, but which have not yet been recognized in the United States. The work in which they were published is quite rare in this country and consequently inaccessible to the majority of our students. Doubtless some, at least, of these names are synonymous with others now in use, but the descriptions are so meagre that it has not been possible to identify them. As all the species were described by Motschultsky, I have reprinted the table of the genera into which he has divided *Tachys* (Etudes Ent., 1862, xi, p. 27). The species follow under his generic names, those of each genus being arranged in alphabetical order.

The table of genera is as follows:*

I. "Antennes allongées, composées d'articles plus longs que larges.
a.—Corps plus ou moins convexe, ovalaire, luisant:
1. élytres rétrécies vers la base, glabres au milieu; avec un petit sillon basal et un entier vers la suture et la marge lateral. . **Tachylopha.**
2. élytres profondement sillonées vers la suture. . . . . **Tachynra.**
b.—Corps plus ou moins déprimé, oblong ou parallèle, avec un reflet metallique changeant sur les elytres, qui sont striées surtout vers la suture. **Tachys.**
c.—Corps déprimé, allongé, parallèle; élytres multistriées; tête petite, courte; troisième article des palpes max. elargi. . . . . **Lymnastis.**
II. Antennes pas ou à peine plus longues que la moitié du corps, robustes, grossissant vers l'extrémité et composées d'articles plus ou moins larges.

* Of our other North American species Motschultsky refers the following to the genera given in the table:

Tachynra—dolosus, xanthopus, vivax and *incurvus.*
Tachys—fallax and *scitulus.*
Lymnastis—æneseens
Tachymenis—nanus and *flavicauda.*
Polyderis—corruscus.

a.—Corps déprimé, presque parallèle; cotés du corselet rebordés sur toute leur largeur, sans angles relevés en arrière; élytres multistriées; elles vivent sous l'écorce des arbres..... **Tachymenis.**

b.—Corps un peu convexe, ovalaire; cotés du corselet rebordés seulement en arrière avec les angles à peine saillants: élytres glabres, sans stries ou à peine marquées de chaque coté de la suture de sillons plus ou moins effacés; palpes grands, de la longueur de la tête, graduellement atténués en avant..... **Polyderis.**"

Tachyura brunnicollis Motsch., Etudes Ent., 1862, xi, p. 28.—"Elongato-ovata, convexa, nitida, glabra, rufo-brunnea, elytris, antennarum apice oculisque nigris, antennarum basi pedibusque rufo-testaceis; capite triangulare, fronte plano, utrinque oblique sulcato; thorace capite ½ latiore, transverso, postice subangustato, truncato, basi transversim impresso, angulis rectis, paulo prominulis, anticis rotundatis; elytris thorace paulo latioribus et fere triplo longioribus, convexiusculis, glaberrimis, postice arcuatim attenuatis, sutura utrinque unisulcatum."

"Long. 1 l.—lat. elytr. ¼ l."

"De la forme convexe de la *T. vivex* Lec., mais sans taches testacées sur les élytres."

"Je l'ai prise assez communement aux environs de Mobile dans le midi des Etats-Unis de l'Amerique."

Tachys æneipennis Motsch., Etudes Ent., 1862, xi, p. 29.—"Elongato-subovata, depressa, nitida, nigra, elytris æneo-sericeis; thorace brunnescente, ore, palpis, antennarum basi pedibusque pallido-testaceis; capite triangulare, inter oculos bifoveolata; thorax capite paulo latiore, subquadrato, postice angustato, basi truncato, profundo transversim impresso, angulis posticis suboblique truncatis, vix prominulis, linea media distincta; elytris thorace paulo latioribus et triplo longioribus, ovalis, indistincto striatis, fere glabris, ad suturam utrinque profundo unisulcatis, ante mediam unifoveolatis.—Long. ¾ l.-lat. elytr. ¼ l."

"Un peu plus large et plus ovalaire que notre *T. bistriata*, à pattes beaucoup plus claires et les élytres un peu metallique."

"Des environs de Mobile dans le sud les Etats-Unis de l'Amerique."

[This species has been very generally regarded as a synonym of *corruscus* Lec. Several characters, however, indicate that this conclusion may be erroneous, and I feel that with our present ignorance of Motschultsky's type we are not warranted in so regarding it.—R. H.]

Tachymenis marginicollis Motsch., Etudes Ent., 1862, xi, p. 32.—"Oblongo-ovata, depressa, nitida, nigro-picea, ore, palpis, antennis pedibusque rufo-testaceis, thoracis lateribus reflexis, testaceis, elytris basi posticeque latorufis; capite minuto, triangulare, inter oculos bisulcato, sulcis valde divaricatis; thorace capite paulo latiore, transverso, quadrangulato, postice recto-truncato, lateribus antice arcuatim subangustatis, angulis posticis rectis, carinulatis; elytris thorace ½ latioribus et 2½ longioribus, ellipticis, antice truncatis, medio fere parallelis, striatis, striis postice obliteratis, interstitiis inæqualibus; antennis capite thoraceque conjunctis vix longioribus.—Long ⅗ l.-lat. elytr. ¼ l."

"Formes et couleurs de la *T. flavicauda*, mais un peu plus larges aux élytres, dont la base est roussâtre comme l'extrémité."

"Elle vient des environs de la Nouvelle-Orléans en Louisiane."

[Probably *flavicauda* Say. The abscence of any mention of the dorsal punctures or structure of the mentum prevents one from placing it as a synonym.—R. H.]

Tachymenis reflexicollis Motsch., Etudes Ent., 1862, xi, p. 31.—Oblonga, depressa, nitida, testacea, oculis nigris, capite postice infuscato, triangulare, inter oculos bisulcato, sulcis postice divaricatis, thorace capite $\frac{1}{4}$ latiore, subtransverso, quadrangulato, postice recto-truncato, lateribus lato reflexis, antice arcuatim angustatis, angulis posticis rectis, carinulatis; elytris thorace $\frac{1}{2}$ latioribus et triplo longioribus, ellipticis, subcrenato-striatis, striis postice obliteratis; antennis capite thoraceque conjunctis vix longioribus—Long. $\frac{3}{5}$ l.–lat. elytr. $\frac{2}{5}$ l.

"Par les bords reflechies du corselet, sa forme et sa couleur, cette éspèce rapelle un peu notre *Lathridius transversalis* fraichement éclos."

"Je l'ai trouvée aux environs de New York."

Polyderis glabrella Motsch., Etudes Ent., 1862, xi, p. 34.—"Subovata; fere depressa, nitida, glabra, rufo-testacea, capite nigerrimo, elytris versus suturam paulo infuscatis, ore, palpis, antennis pedibusque subpallido-testaceis; capite triangulare, inter oculos bisulcato, sulcis postice paulo divaricatis, thorace capitis fere latitudine, subcordato, postice impresso, subsinuato-truncato, angustissime marginato, linea media distincta, angulis posticis obtusis; elytris thorace paulo latioribus et $2\frac{1}{2}$ longioribus, antice subparallelis, humeris, distinctis, striis deficientibus; antennis ut in priori" [*T. testaceolimbata*].

"Long. 1 l.–lat. elytr. $\frac{2}{7}$ l."

"Elle est un peu plus parallele que la précedénte et de couleur testacé. Je l'ai prise également à Mobile."

Polyderis testaceolimbata Motsch., Etudes Ent., 1862, xi, p. 33.—"Ovata, leviter convexa, nitida, fere glabra, fusco-picea, fronte nigro-subæneo, ore, palpis, antennis, elytrorum suturam, lateribus pedibusque plus minusve pallido-testaceis; capite triangulare, inter oculos bisulcato, sulcis obliquis, postice divaricatis, pilis longissimis nonnulis; thorace capite paulo longiore, subtransverso, cordato, postice impresso, subsinuato-truncato, angustissime marginato, linea media distincta, angulis posticis subobtusis; elytris thorace $\frac{1}{3}$ latioribus et triplo longioribus, ovatis, striis obliteratis, ad suturam una solum distincta, antennis incrassatis, dimidio corporis paulo longioribus, articulis 4–11 subovato-quadratis, 11° majore, ovato; palpis elongatis, apice valde subulato-attenuatis.—Long. 1 l.–lat. elytr. $\frac{2}{5}$ l."

"Elle est plus large et plus ovalaire que notre *T. bistriata*, les stries sur les élytres très peu distinctes, son corselet sinué sur le milieu du bord postérieur, ses antennes plus larges, plus comprimées

et ses palpes plus longues et plus attenuées vers leur extrémité, ce qui forme déjà une transition vers celles des *Trechus* et des *Anophthalmus*. *Pol. corrusca* Lec. est plus large et plus courte."

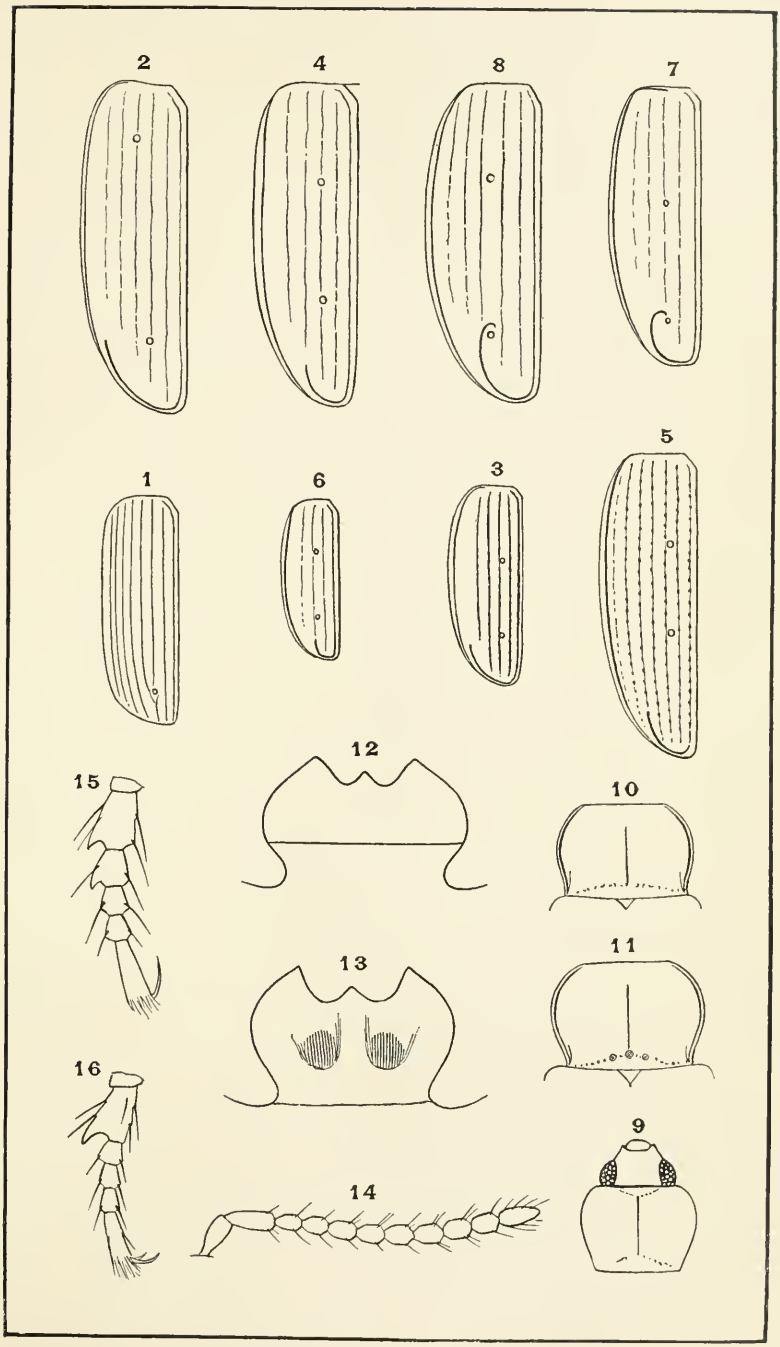
"J'ai ramassé cet interessant insecte aux environs de la ville Mobile dans le sud des Etats-Unis de l'Amerique du Nord."

EXPLANATION OF PLATE VI.

Fig. 1.—Elytron of *Tachys æneseens.*
" 2. " " *T. nanus.*
" 3. " " *T. flavicauda.*
" 4. " " *T. tripunctatus.*
" 5. " " *T. ephippiatus.*
" 6. " " *T. lævus.*
" 7. " " *T. vittiger.*
" 8. " " *T. proximus.*
" 9.—Head and thorax of *T. æneseens.*
" 10.—Thorax of *T. incurvus.*
" 11. " " *T. tripunctatus.*
" 12.—Mentum of *T. vivax.*
" 13. " " *T. proximus.*
" 14.—Antenna of *T. lævus.*
" 15.—Anterior tarsus of *T. proximus* ♂.
" 16. " " " *T. corruscus* ♀.

ERRATA.

Page 197, line 28, for meidan *read* median.
" 255, " 2 from bottom, for testaceous *read* piceous.
" 229, " 28, for the several *read* several.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NEW GENERA AND SPECIES OF NEARCTIC NEUROPTEROID INSECTS.

BY NATHAN BANKS.

The following pages contain generic synopses of two families of Neuropteroid insects and descriptions of various new genera and species. Several species belong to genera not previously reported from our country, but well known in Europe. Although in some families of Trichoptera there are a considerable number of species common to this country and Europe, our Neuropteroid insects, as a whole, are rather sharply separated from the European fauna. In some large families like the Chrysopidæ and Myrmeleonidæ; there are no species common to the two continents.

PSOCIDÆ.

Psocus oregonus n. sp.

Head yellowish brown; antennæ brown, slightly hairy; thorax black, a pale line each side of the median lobe uniting behind: legs brownish yellow, darker at tips of femora and tibiæ; wings glassy hyaline, with a faint tinge of amber, veins brown, that closing the cell white, cell about twice as broad at base as at tip, sometimes a few brown clouds near middle of wing; the pterostigma margined with heavy veins and prominently brown; hind wings hyaline, veins brownish.

Length 3.5 mm.

Ashland and Divide, Oregon; Temino, Washington, September (A. P. Morse).

Psocus virginianus n. sp.

Black, wings uniform black, veins black, interrupted with white dots and around the margin interruptedly white; hind tibia testaceous, black at tip, basal joint of all tarsi pale yellowish; hind wings blackish hyaline; venation on usual plan, cell four sided, as broad at tip as at base; antennæ slender, not hairy.

Length 3.5 mm.

Falls Church, Virginia; August, September; living in crevices of old rails, posts, etc. Easily known by uniform black color and dotted veins.

Psocus barretti n. sp.

Head yellowish, nasus lineate with black, legs yellowish brown, paler below, darker on outside and at tips of femora and bases of tibiæ, tarsi dark; antennæ nearly black, with short hairs; thorax brown, blackish in front, a white line on each side of the median lobe, uniting behind; wings hyaline, brown clouds along apical margin, and from its end a band obliquely across to the pterostigma

formed by a cloud in each cell, two clouds on anal margin near base, a black dot at base of the pterostigma, basal veins white, around pterostigma white, vein closing cell and base of the radial fork also white, otherwise the veins are black; hind wings unmarked, veins black; cell four sided, as wide at apex as at base.

Length 7 mm.

Distrito Federal, Mexico (Barrett).

PERLIDÆ.

It has long been recognized that the Perlidæ could be divided into two groups by the presence or absence of caudal setæ. This, I consider, a character of importance, yet hardly sufficient for subfamily distinction. As of equal value, I would rank the position of the anterior coxæ. In an attempt to use the ventral structure for the discrimination of genera, I discovered that the genus *Pteronarcys* differs remarkably from all our other Perlidæ in that the anterior coxæ are approximate and directed downward, while in the other forms these coxæ are well separated and directed outward. This character, in connection with the other peculiarities of the genus, warrant the erection of a tribe for it. The genus *Capnia* has long been recognized as a very distinct one. The most important character which distinguishes it (and allied genera) from *Perla* has not, I think, ever been mentioned; it is in the fact that the radial sector is not furcate beyond the anastomosis. Despite the fact that in many respects the venation of the Perlidæ is often variable, there are some points which appear fairly constant. The forking of the radial sector, and a point in regard to *Perla* (as restricted) hold true for all the specimens examined. These groups of Perlidæ may be considered as tribes. They can be separated in tabular form as below:

1. Caudal setæ absent ..... Nemourini.
   Caudal setæ present ..... 2.
2. Radial sector not furcate beyond anastomosis, veins rather heavy, small black species ..... Capnini.
   Radial sector forked beyond anastomosis ..... 3.
3. Anterior coxæ directed downward and approximate: venation of wings often irregular ..... Pteronarcini.
   Anterior coxæ directed outward and well separated; venation more regular, with fewer cross-veins ..... Perlini.

Our Pteronarcini include two genera, *Pteronarcys* and a new genus, *Pteronarcella*, for the two small species of *Pteronarcys* (*badia* and *regularis*) from the West. The latter genus is related to *Dictyopteryx* of the Perlini.

1. In the fore wing the space between basal part of radial sector and median vein is free ..... **Pteronarcella.**
   This space shows complete or incomplete cross-veins and cells which indicate two rows ..... **Pteronarcys.**

The Perlini is the most extensive tribe of the family, both in genera and species. At present I separate in our fauna eight genera. Several others will doubtless be erected as our knowledge of these forms progresses.

1. Apical space of fore wings with several transverse veinlets ..... 2.
   Apical space of fore wings free or rarely with a few veinlets ..... 3.
2. Space between radius and radial sector with transversals.. **Dictyopteryx.**
   Space between radius and radial sector free ..... **Acroneuria.**
3. No folded anal space to hind wings, small pale species ..... **Isopteryx.**
   Anal space present ..... 4.
4. But two ocelli ..... **Pseudoperla.**
   Three ocelli ..... 5.
5. Radial sector with a fork at or even before the anastomosis, normally connected in some way with the cross-vein closing the cell; larger species, not greenish ..... **Perla.**
   Radial sector with the first fork plainly beyond the anastomosis, not connected with the cross-vein closing the cell ..... 6.
6. Radial sector four forked; never greenish species, a pale median stripe on prothorax ..... **Isogenus.**
   Radial sector less than four forked, rarely more than two; smaller species.. 7.
7. Radial sector only once forked, if two, then greenish species, beyond end of subcosta usually but one transversal ..... **Chloroperla.**
   Radial sector usually at least two forked, if but once, then two transversals beyond end of subcosta in costal area and not greenish species. **Perlinella.**

The Capnini embraces three genera in our fauna. In Europe there is another genus—*Capnopsis*—which lacks the anal region to hind wings (present in all our forms). The South American *Griphopteryx* will probably fall in this tribe.

1. Apical submarginal space with transverse veinlets ..... **Capnura.**
   Apical submarginal space without transverse veinlets ..... 2.
2. Space beyond discal cell as long as discal cell ..... **Arsapnia.**
   Space beyond discal cell shorter than discal cell ..... **Capnia.**

Our Nemourini are grouped in three well-defined genera. This tribe shows much affinity to the Capnini, but lacks the distinctive character of the venation in many forms. The genitalia are often very complex.

1. Second joint of tarsus about as long as first ..... **Taeniopteryx.**
   Second joint of tarsus much shorter than the first ..... 2.

2. Veins of pterostigma forming an X, wings not involute.....**Nemoura.**
Veins of pterostigma not forming an X, wings more or less involute; slender species .....**Leuctra.**

PTERONARCELLA n. gen.

Similar to *Pteronarcys*, but much smaller and with rather narrower fore wings, which are furnished with fewer and more regular cross-veins; the space between the basal part of the radial sector and the median vein is free; the radial sector but two forked (three or more in *Pteronarcys*); and near the margin the space between the median and cubitus shows normally but one row of cells (in *Pteronarcys* there are two rows).

Type, *P. regularis* Hagen.

PERLINELLA n. gen.

Related to *Perla*. Two setæ; anal space of hind wings present; three ocelli; anterior coxæ well separated; radial sector one to three forked, the first beyond the anastomosis; beyond end of subcosta several cross veins, no cross-veins in subapical area; not greenish species; size rather small.

Type, *P. trivittata* Banks.

Acroneuria pacifica n. sp.

Head yellowish, with a blackish spot between the ocelli and each side extending obliquely forward toward the bases of antennæ, clypeus black, thorax dark brown, abdomen brown, more yellowish beneath, setæ testaceous, wings uniformly tinted with brown (darker than in *A. abnormis*), legs brown, yellowish at the kness. The prothorax is plainly narrowed behind, rather suddenly from the middle, rugose above, with a broad shallow furrow each side of the median suture (these furrows are broader than in the other species known to me, *abnormis*, *arida* and *ruralis*). The radial sector arises farther out than in *A. abnormis*, and is furcate somewhat beyond the anastomosis, there are no cross-veins in the posterior apical part of the wings. The ventral plate of the female is rounded behind, almost angular in the middle, on each side is a transverse impression, and on the basal half is a median longitudinal ridge, on the apex is an almost square shining space, transversely striate.

Length with wings 41 mm.

Olympia, Washington [Trevor Kincaid].

Perla sabulosa n. sp.

Head pale yellowish, a dark spot upon ocelli, antennæ rather pale brown, prothorax dull yellowish, abdomen pale brownish, yellowish beneath, dark on the tip, setæ light brown, wings hyaline, scarcely smoky, legs pale testaceous, bases of the tibiæ darker as also the tarsi. Prothorax hardly as broad as usual, slightly narrower behind, hind angles rounded, above rugose; wings reach beyond the setæ.

four or five subcostal cross-veins before origin of the radial sector, the latter forked near anastomosis and twice beyond. The eighth ventral segment of the female is scarcely produced, but distinctly acutely emarginate in the middle, the ninth is darker colored, with a median ridge from near the middle of which, on each side, a ridge curves outward and to the hind margin, inclosing a semicircular space; on each side of this segment is a large prominent pale spot; the tenth segment has an impressed spot each side at base.

Length with wings 32 mm.

Yakima, Washington (C. V. Piper). The pale spot on each side of the ventral surface of the penultimate segment separates this species from any others in our fauna.

Perla americana n. sp.

Head broader than prothorax, bright yellow, with a dull black trilobed spot covering the ocelli, and some black in front, basal joint of antennæ black above, second entirely yellow, rest yellowish below at base, brownish elsewhere. Prothorax once and one-half broader than long, broadest in front, sides straight, angles acute, a median smooth space, each side rugulose, entirely black; legs yellow, above with black stripe and below on the femora. Meso- and metathorax black. Abdomen dull yellowish above; venter more clear, with a few black marks near tip; setæ entirely black; mentum and sternum black, coxæ clear yellow. Roots of the wings and costal margins yellowish, rest nearly hyaline, veins black, the radial sector normally forked but once beyond the anastomosis and once at anastomosis. Ventral lobe of female produced in middle, narrow and rounded at tip.

Length ♀ 25 mm.

Falls Church, Va., June; Michigan, June.

Differs from *P. tristis* by larger size, pale costa of wings, more produced and narrower ventral lobe of the female.

Dictyopteryx irregularis n. sp.

Head pale reddish yellow, with a blackish stripe each side, passing through lateral ocelli, a black spot connects lateral ocelli to the median one and passes forward each side of clypeus. Antennæ yellowish brown. Prothorax yellow-brown, the elevations blackish. Legs pale, black on femora just before tip and on bases of tibiæ. Abdomen brown; setæ brownish; wings smoky. Head hardly as broad as prothorax, latter rather longer than in *D. signata*, sides straight, angles acute, somewhat rugose on the sides, smooth in middle. Wings with many cross-veins, very irregular, a few project from radial sector into the cell, and sometimes connect to radius, none, however, in the posterior apical space, very few in the basal costal space, sometimes free till near middle, radial sector arising well toward base; setæ reach beyond end of wings, joints slender; ventral plate of female longer than broad, rounded at tip, and narrowly but deeply emarginate.

Length with wings 30 mm.

Mt. Ranier, Washington (C. V. Piper).

Readily separated from *D. signata* by larger size, markings of head and thorax, irregular venation and shape of ventral plate of the female.

Chloroperla minuta n. sp.

Black, bases of antennæ yellowish, especially below, a small pale spot on middle of hind margin of the head, an indistinct pale median stripe on prothorax, hind tibiæ brownish yellow; setæ yellowish, of twelve to fourteen joints; wings subfumose, pale yellowish along the costal area, veins black, not heavy, a fork near apical part of radial sector. Disk of prothorax finely rugulose each side.

Length 5 mm.

Columbus and Medina, Ohio, May and June (J. S. Hine).

This, at first sight, looks like a *Capnia*, but the forked radial sector, the finer veins, the shorter hind tarsi and the pale spots on the head, prothorax and bases of antennæ are characters foreign to *Capnia*. This is the smallest species of the genus *Chloroperla*, but agrees with the other species in all essential characters.

Taeniopteryx pacifica n. sp.

Head dull black; antennæ brown; prothorax dull black, anterior margin, and usually the lateral margins narrowly reddish, base of mesothorax reddish, rest of body black; legs yellow-brown, knees rather darker. Wings dull hyaline, without marks, or an indistinct cloud near the middle, hind pair hyaline, veins brown. Prothorax rather broader than long, a transverse sulcus in front, on the disk are scattered small flat tubercles or scars; second joint of tarsi as long as first, tips of tibiæ with a pair of minute spines; ventral plate of the female is nearly semicircular. Wings long, slender, subcostal with several cross-veins to margin near tip, and a few near base, radial sector with but one fork beyond the anastomosis, the vein from the discal cell arises near the radial sector, pterostigmatic region long, with but one cross-vein.

Length to tip of wings 12 mm.

Pullman, Washington, April (C. V. Piper, R. W. Doane).

Taeniopteryx occidentalis n. sp.

Head dull black, antennæ dark brown; prothorax dull black, with anterior margin narrowly reddish, rest of body black; legs brown, darker on the femora; wings hyaline, with dark irregular narrow bands, one at apex, one slightly before it, one from the pterostigma, and a broader one toward base, also a basal spot; veins brown, hind wings unmarked. Prothorax rather longer than broad, equally broad in front and behind, near the front with a distinct transverse sulcus, on the disk without scars or sculpture; second joint of tarsus nearly as long as first; two small spines at tips of all tibiæ; female ventral plate large, as long as broad, narrow and rounded at tip. Wings hardly as long as usual, radial sector two-branched beyond the anastomosis, subcosta with three or four short cross-veins to the margin near tip of wing, pterostigma with two stout cross-veins.

Length to tip of wing 13 mm.

Mt. Ranier, Washington (C. V. Piper).

Nemoura stigmata n. sp.

Head black, antennæ yellowish brown; legs yellowish, black on apex of femur and base of tibia; prothorax yellow-brown; abdomen black, genitalia yellowish

brown; wings pale, veins brown, above and beyond the oblique vein, which forms the X, is a brown spot, a similar spot in the hind wings, the apex of wing in the vicinity of radius is clouded with brown. Prothorax once and one-half broader than long, broadest behind, a median furrow and a ridge each side, scarcely rugulose on sides, margin straight; a small spine at apex of tibia; wings elongate, the radial sector arises quite close to the base, not forked beyond anastomosis, the subcosta running into the oblique cross-vein, the oblique vein above radius, which forms the X, is situate some distance beyond the basal cross-vein. Male with a spine below before tip, genitalia extremely complex and very prominent.

Length 15 mm.

Winnipeg, British America, June (Received from Dr. J. B. Smith).

CAPNURA n. gen.

With setæ; anal space to hind wings present; veins not very heavy; space beyond discal cell long; discal cell giving off two sectors; second tarsal joint short; anterior coxæ well separated. The space between the radius and radial sector beyond the anastomosis is traversed by two or three irregular cross-veins; no such arrangement exists in any of the allied genera.

Capnura venosa n. sp.

Black; wings infuscate, veins black; tibia slightly paler than the rest of leg; vertex with a small median depression above the ocelli; antennæ about one-half the length of the body, basal joint rather large but short; wings slender, fully twice as long as the abdomen, median space with but one transverse veinlet; setæ with about fifteen joints.

Length 9–10 mm.

Pullman, Washington, April (R. W. Doane).

EPHEMERIDÆ.

The classification of the may-flies has long been extremely difficult, and there is no prospect that it will ever be very easy. The groups of *Cœnis* and *Bætis* are undoubtedly very distinct; the former is probably related to *Polymitarcys*. This latter genus, by the number of veins between veins 8 and 9,* differs greatly from all others; it appears to be one of the most primitive genera. The genus *Bætisca* is peculiar among all may-flies by the course of veins 9 and 9^1, therefore, I think, merits to stand alone. *Blasturus* falls as a synonym of *Leptophlebia*, as the slight difference between the

* I use 8 for the anal, and 9 for the 1st axillary, 9^1 for second axillary, and 6 for the præbranchial, exactly as given by Eaton.

length of the median seta is not of generic importance. *Heptagenia* agrees with *Leptophlebia* in having the veins between 8 and 9 intercalary, therefore, I have grouped the genera together. The tabulated differences appear considerable; but the hind tarsus of *Leptophlebia* nearly always shows traces of a basal joint, the number of setæ is at most of generic value; the difference in position of the eyes holds only for the male. Therefore, I believe that these two genera are more closely related to each other than either is to any other genus in our fauna. The remaining genera, the *Ephemera* and *Siphlurus* groups, offer but few important venational distinctions; a combination of certain minor characters serve to distinguish the two groups.

Ephemerella I place with *Siphlurus*, as in the latter some species have some costal cross-veins indistinct. I consider these groups as of tribal value and tabulate them as below:

1. Hind wings very small or absent, when present over twice as long as broad, with only two or three longitudinal veins, fore wings broad at base, vein 6 simple or the wing ciliated (imago), small species.....6.
   Hind wings always present, if small, about as broad as long, many-veined, fore wings narrower at base, broadening beyond, vein 6 always forked, wing never ciliated (imago).....2.
2. Veins 9 and 9^1 parallel to anal margin and ending in outer margin, mesonotum very large, eyes of ♂ contiguous, two setæ.....Bætiscini.
   Veins 9 and 9^1 ending in anal margin, not parallel to it, mesonotum not so large.....3.
3. Between 8 and 9 four long longitudinal veins subparallel to 8, furnished with many cross-veins, wings white, eyes of ♂ separate, ♂ two setæ, ♀ three setæ, usually no cross-vein basad of the intercalary between forks of 6.....Polymitarcini.
   Between 8 and 9 at most only two longitudinal veins, not very long, nor subparallel to 8, and with few, if any, cross-veins, wings not white....4.
4. Between 8 and 9 the veins mostly intercalary, no series of cross-veins from 9^1 to margin, 9 is usually connected to branches of 8 (except in very small species).....Leptophlebini.
   Between 8 and 9 the veins are mostly branches of 8; 9 is usually not connected to branches of 8.....5.
5. No cross-vein basad of the intercalary between forks of 6, 9 not connected to branches of 8, no series of cross-veins from 9^1 to the margin, eyes of ♂ contiguous, basal costal cross-veins often few, indistinct or incomplete.....Siphlurini.
   Often a cross-vein basad of the intercalary between forks of 6; a series of veinlets from 9^1 to the margin, when not, then 9 connected to branches of 8; many basal costal cross-veins, all distinct, eyes of ♂ separate.....Ephemerini.

6. Vein 6 simple, some apical short intercalary veins, margin not ciliated, eyes of ♂ turbinate.....Bætini.
Vein 6 forked, no apical short intercalary veins, margin ciliated, eyes of male not turbinate, widely separate, but two wings.....Cænini.

The Bætiscini includes only one genus, *Bætisca*. The genus is remarkable on several accounts, which justify the tribe for it. It is, I think, most nearly allied to *Heptagenia*.

The Leptophebini includes two genera in our fauna, which are separated as follows:

Hind wings more or less angulate on costa near base; costal cross-veins usually not very irregular at outer costal curve; two setæ; eyes of ♂ separate; hind tarsi 5-jointed.....**Heptagenia.**
Hind wings not angulate on costa near base; costal cross-veins at outer costal curve more numerous, curved and irregular; setæ three; eyes of ♂ contiguous, hind tarsi 4-jointed.....**Leptophlebia.**

The Siphlurini also embraces two genera in our fauna; possibly *Siphlurus* can be divided on good characters, but I do not think those previously used are of generic value.

Basal costal cross-veins none or extremely indistinct; three setæ.
Ephemerella.
Basal costal cross-veins distinct, at least some of them; but two setæ.
Siphlurus.

The Ephemerini are represented by three genera, which can be separated as follows:

1. A series of basal cross-veins from 9[1] to anal margin, vein 9 rarely connected to branches of 8.....2.
No series of basal cross-veins from 9[1] to margin, at most two or three, vein 9 usually connected to branches of 8; three setæ, but the median one in ♂ is very rudimentary.....**Pentagenia.**
2. Three subequal setæ; wings often maculate.....**Ephemera.**
But two setæ, the median very rudimentary, wings not maculate.
Hexagenia.

The Polymitarcini includes only the genus *Polymitarcys* in our country. The European *Jolia* probably belongs to the tribe.

The Cænini includes in our country only *Cænis*, other genera are known in Asia.

The Bætini embraces four genera, separable as follows:

1. With but two wings.....**Cloëon.**
With four wings.....2.
2. No basal costal cross-veins.....3.
Basal costal cross-veins distinct.....**Callibætis.**
3. Short apical intercalary veins in pairs.....**Bætis.**
Short apical intercalary veins single.....**Centroptilum.**

Leptophlebia basalis n. sp.

Dark brown; abdomen dark red-brown; legs pale, with a brown spot on middle and at tips of femora; setæ pale, annulate with brown; wings hyaline, roots dark brown, sometimes infuscate with reddish for a short distance, and also on basal half of hind wing; veinlets in costal area to bulla are weak and indistinct, but few cross-veinlets in middle of wing, no short intercalaries along the apical margin; hind wing small, but about as broad as long, costal margin swollen on middle, but not angulate; male has anterior femora brown.

Length 4 mm.; expanse 11 mm.

Sherbrooke, Canada, July; Montgomery County, Pennsylvania, September.

Readily known by the brown roots of the wings.

CALLIBÆTIS.

The females of our species of this genus can be separated by the following table:

1. Hind portion of fore wing destitute of cross-veins, but one posterior row of them, only about 15 to 25 cross-veins in wing beyond the vitta.....2.
   Hind portion of fore-wing with cross-veins, at least two posterior rows of them, about 35 to 50 cross-veins in wing beyond vitta.....6.
2. Wing with faint clouds at ends of veins, the vitta has several projections backward, markings dark brown.....**undatus.**
   No markings except the vitta.....3.
3. Basal costal space hyaline, middle cross-veins brown.....4.
   Basal costal space included in the vitta.....5.
4. Costa marked with dark spots; legs pale; hind edge of vitta with very small if any indentations.....**montanus.**
   Costa pale; femora plainly dotted with brown; hind edge of vitta with several distinct indentations.....**floridanus.**
5. Middle cross-veins white; vitta widely indented behind; spots along margin large; vitta dark brown; femora plainly marked with brown.
   californicus.
   Middle cross-veins brown; vitta narrowly indented behind; spots along margin smaller; femora barely, if any, marked with brown..**fluctans.**
6. Wing with several brownish clouds, many fuscous marks along the veins.
   tessellatus.
   No clouds; only the costal vitta.....7.
7. Vitta broadly interrupted so as to be three barely connected spots; dark brown in color.....**coloradensis.**
   Vitta not so interrupted.....8.
8. Vitta pale ferruginous, setæ and femora unmarked, large species...**pallidus.**
   Vitta brown, setæ and femora usually marked with brown.....9.
9. Body pale reddish brown; legs pale, only slightly marked with brown; vitta does not extend back farther in second lobe than elsewhere.
   ferrugineus.
   Body dark brown; legs more or less marked with fuscous; vitta extends back farther in second lobe than elsewhere.....**americanus.**

Callibætis montanus Eaton.

Eaton, Riv. Mon. Ephemer., p. 196 (1884).

Yellowish brown, dorsum darker; femora scarcely marked, tarsi and setæ hardly annulate; basal costal region hyaline; the costa is, however, interruptedly white and brown; vitta pale brownish, broader at base, hind edge regular, with only a few indistinct and narrow indentations; cross-veins brown, about twenty-two beyond vitta, only one posterior series; vitta has only a few small spots on the basal part.

Length 8 mm.; expanse 19 mm.

Near Tacubaya, D. F., Mexico (O. W. Barrett). Central America (Eaton).

Callibætis floridanus n. sp.

Body uniform ferruginous; femora thickly dotted with brown, tips of tarsal joints brown; setæ pale, narrowly annulate with brown; costa of wings unmarked, basal costal region hyaline, vitta pale brownish, broader at base, with about seven or eight small narrow indentations on hind edge, otherwise the edge is very regular, cross-veins in middle of wing brownish, about twenty cross-veins beyond vitta, only one posterior series.

Length 6 mm.; expanse 15 mm.

Biscayne Bay, Florida (Mrs. A. T. Slosson).

Callibætis fluctuans Walsh.

Walsh, Proc. Acad. Nat. Sci. Phil., 1862, p. 379.

Brown; femora faintly dotted with brown; tips of tarsal joints brown; setæ narrowly annulate with brown; vitta of wing yellowish brown, including the basal costal space, broader at base, with only two or three small indentations on hind edge, all beyond the middle, many spots in costal region, about eighteen cross-veins beyond vitta, all brown, only one posterior series.

Length 7 mm.; expanse 15.5 mm.

Washington, D. C.; Illinois (Walsh). Eaton has placed this as a synonym of *C. ferruginea*, but they are very different and in different sections of the genus.

Callibætis californicus n. sp.

Brown; femora plainly and thickly dotted with brown; tarsal joints tipped with brown; setæ narrowly annulate with brown; vitta of wing dark brown, including the basal costal space, with about eight or ten indentations on hind edge, those on basal part quite wide; costal area to beyond middle much marked with pale, not round spots, but short bands from vein to costa; about twenty-two cross-veins beyond vitta, those of middle plainly snow-white, only one posterior series of cross-veins.

Length 6 mm.; expanse 15 mm.

Southern California (A. P. Morse).

Callibætis undatus Pict.

Pictet, Ephemer., p. 264 (1845).

C. pictus Eaton, Trans. Ent. Soc. Lond., 1871, p. 122.

Brown; femora thickly spotted with brown, tarsi brown, and usually a spot on

tibiæ; setæ annulate with brown, rather broadly at base; vitta of wing much broken up into spots, three larger than others, basal costal space hyaline, but along the costa are scattered brown dots; on apical part of wing and along outer margin are many more or less distinct clouds, usually around veins; about twenty-two cross-veins beyond vitta, some of them white, but one posterior series.

Length 8 mm.

Near Tacubaya, D. F., Mexico (Barrett). Eaton records it from Texas, California and various places in Mexico.

Callibætis tessellatus Hag.

Hagen, Syn. Neur. N. Amer., p. 50 (1861).

C. hageni Eaton, Riv. Mon. Ephem., p. 192 (1884).

Dark brown, femora but little dotted with brown, setæ narrowly annulate with brown; vitta of wing dark brown, including the basal costal space, broader at base, hind edge with three broad and deep indentations, and several smaller toward tip, the vitta in second lobe extends back on the wing for some distance (farther than in other species), along the costal area are a number of hyaline spots; along veins are many short, narrow brown clouds; many cross-veins beyond vitta, many of them white, two irregular series of posterior cross-veins.

Length 8 mm.; expanse 17 mm.

Tacoma, Washington, Sept. (A. P. Morse); California, according to Eaton.

Callibætis americanus n. sp.

Very dark brown, almost black; femora thickly dotted with brown; tarsi and setæ marked with brown; vitta of wing dark brown, broader at base, hind edge quite even, with three principal indentations, usually quite narrow, costal area with hyaline spots, no clouds along the veins; many cross veins, mostly white; two quite regular series of posterior cross-veins; base of hind wing often brown.

Length 7.5 mm.

Pullman, Washington, April (R. W. Doane), also one from Clear Creek, Colorado, September (Oslar). A specimen from Franconia, N. H. (Mrs. Slosson), seems to fall here, but the vitta is not well developed.

Callibætis coloradensis n. sp.

Dark brown; femora finely dotted with brown; tarsi tipped with brown; vitta of wing dark brown, broken up into three principal spots, one, the largest, apical, one pterostigmatical, one before the middle, and a smaller one at base; basal costal space hyaline; the longitudinal veins are in places slightly marked with brown; the cross-veins are numerous, mostly white; two irregular posterior series; the abdomen is shorter than in the other species of this section.

Length 7 mm.; expanse 16 mm.

Durango, Colorado, June (Oslar).

Callibætis ferrugineus Walsh.

Walsh, Proc. Acad. Nat. Sci. Phil., 1862, p. 379.

Ferruginous; femora thickly spotted with light brown, tarsi and setæ marked

with brown; vitta light brown, covering basal costal space, with many transverse hyaline spots in costal area, hind edge with three principal indentations and two smaller toward tip, otherwise quite even, no clouds along veins, although they are brown in parts; cross-veins beyond vitta numerous, mostly white, two and often more series of posterior cross-veins.

Length 6.5 mm.; expanse 16 mm.

Sea Cliff, New York; Agric. Coll., Michigan (Pettit); Illinois (Walsh).

Callibætis pallidus n. sp.

Pale ferruginous; femora and setæ pale, unmarked, tarsi blackish; costa marked with brown and white; vitta pale ferruginous, extreme basal costal space hyaline, vitta with a number of hyaline spots, especially near the pterostigmatic region, hind edge with several broad indentations, especially on basal half; many cross-veins beyond vitta, mostly white, two and often more posterior series.

Length 9 mm.; expanse 21 mm.

Clear Creek, Colorado, September (Oslar). Distinct by large size, pale color, etc.

CHRYSOPIDÆ.

Leucochrysa mexicana n. sp.

Face yellowish, reddish toward mouth; basal joint of antennæ yellowish, with a red line on upper inner side and a red spot on outside, rest of the antennæ whitish, darker on tips; vertex green, separated from face by a transverse red line from eye to eye, angulate at middle; prothorax green, red on the side margins, narrowed in front; mesothorax green, the anterior lobes each with a red spot; legs pale greenish; wings hyaline, veins green, transverse ones mostly black, pterostigma brown, the divisory veinlet of third cubital cell reaches nearly to end of cell; hind wing similar to fore wings, but with fewer cross-veins dark, pterostigma brown, very distinct.

Length 17 mm.

Chavarillo, Vera Cruz, Mexico (Barrett).

PANORPIDÆ.

Panorpa signifer n. sp.

Reddish; mouth rather blackish; basal joints of antennæ pale, rest dark brown; legs yellowish; basal segments of abdomen brown above; wings hyaline, with brown spots and bands, two basal spots, a band—sometimes interrupted—before the middle, a median costal mark, a broad band beyond middle, forked behind, the outer part sometimes disconnected, and a broad apical band, which has a pale area on the lower outer side, in this spot the cross-veinlets are white; hind wings similar to fore pair, but the band beyond middle is a trifle more broad than in fore pair, while the basal marks are smaller. In fore wing the costal vein runs to the pterostigma. Fifth abdominal segment of male has a short conical projection above at tip, the sixth segment is strongly constricted at base and suddenly enlarged near middle.

Gaylord, Michigan, July (R. H. Pettit). This bears much resemblance to what I consider *P. venosa*, but the projection on tip of fifth segment is smaller, and the sixth segment is more constricted, besides the genitalia are not so much elevated in the middle when seen from the side.

TRICHOPTERA.

Agrypnetes curvata n. sp.

Pale yellowish, clothed with short yellowish hair, veins at and near anastomosis darker, abdomen brown above; head large, three large ocelli; antennæ short and stout, well separated at base; prothorax with two warts above; legs very stout, spurs very short, 2-4-4; the joints two to four of anterior tarsus very short, practically no spines, on hind legs, however, there are extremely minute ones on the tarsi; anterior tarsi do not show any fringe of hair; wings very narrow, the costal margin concave, the posterior margin convex; venation almost the same as the European species (*A. crassicornis*), the discal cell is a trifle longer, and the posterior anastomosis rather more oblique, the anal venation is exactly the same, surface of wing nearly bare.

Length 11 mm.

St. Anthony Park, Minnesota (Pettit). When the wings are closed the insect in side view is highest at middle and curves down each way. I place this in *Agrypnetes* on account of the close correspondence in venation, in absence of spines on legs, in structure of legs, in size and color; but the spurs are plainly 2–4–4.

LEPTOPHYLAX n. gen.

Spurs 1–3–4. Basal joint of antenna nearly as long as broad, antennæ rather short and stout; prothorax well developed, flat above as well as the vertex of head, both traversed by a median furrow. Wings very slender, acute at tips, discal cell nearly twice as long as its pedicel, first apical cell some distance on discal cell, fifth apical short pedicellate; hind wings slender, emarginate as in *Colpotaulius*, fifth apical cell long pedicellate, first some distance on discal cell.

Leptophylax gracilis n. sp.

Head yellowish; a median black line on vertex, which is flat, clothed with long erect yellowish hairs, prothorax flat above, about twice as broad as long, surface tuberculate, a median black line, clothed with erect yellowish hair; antennæ yellowish, apex more reddish, basal joints long, well separated; legs pale yellowish, with black spines, none on anterior face of fore tibiæ, hind femora plainly shorter and stouter than middle femora, hind tibiæ curved. Wings over four times as long as broad, broadest beyond anastomosis, pale yellowish hyaline, not rugulose, veins brown, a brown streak through many of the cells sometimes

broken into spots, the anal margin toward base almost wholly brown, surface with scattered short yellowish hairs. Hind wings hyaline, veins yellowish. Abdomen yellowish.

Length 16 mm.

St. Anthony Park, Minnesota (R. H. Pettit).

Limnophilus americanus n. sp.

Pale yellowish, head between antennæ and basal joints of antennæ beneath more reddish; thorax with a pale reddish brown stripe each side; wings yellowish hyaline, marked, chiefly in the posterior half, with light brown, before the middle of the discal cell there arises a whitish oblique mark, which cuts across the brown part, and at anastomosis another mark, which, however, does not extend completely across the brown, and before middle of the apical cells is another whitish, somewhat crescentic mark, the middle of apex of wing is hyaline, but the third cell is brown, as well as most of the subapicals; the pterostigmatic region is slightly brownish; legs pale yellowish, the spines black, except those on the anterior face of the fore tibiæ, which are yellowish. Wings of moderate length, discal cell a little longer than the pedicel, first apical about its width on discal cell, fourth apical narrow at base, fifth a short distance on thyridial area, cubitals fractured at anastomosis.

Length 14 mm.

Idaho (C. V. Piper). One from Orono, Maine (Harvey), appears to belong to this species, but it is rather smaller and darker.

Limnophilus consimilis n. sp.

Clear pale yellow, clothed with yellow hair; thorax and abdomen pale brown, middle of thorax clothed with yellow hair, legs pale yellow, spines black; wings yellowish hyaline, veins yellow, posterior half of wing light brown; through the middle of the thyridial area is a silvery-white stripe, which at base turns slightly backward, limited behind by a dark brown stripe, first and second apical cells pale throughout, the others silvery white in base, limited by a wavy, dark brown mark, the third and fourth pale to beyond middle, the fifth on less than basal half, the thyridium broadly marked with brown from one anastomosis to the other, a silvery spot in thyridial cell near base, costal space unmarked, fringe on apex of wing blackish; discal cell plainly longer than its pedicel, fifth apical cell only a short distance on thyridial area; hind wings hyaline, grayish on tip, veins yellowish.

Length 18 mm.

South Park, Colorado, August (Oslar).

Related to *L. ornatus* Bks., but wings broader, the silvery mark not oblique, the fifth apical cell pale only in base, and other differences.

Asynarchus centralis n. sp.

Black, clothed with black hair; palpi slender; basal joints of antennæ long and well separated, rest of antennæ narrowly annulate with pale; femora at tips, most of tibiæ and the tarsal joints pale; spines black; wings uniform blackish, sparsely clothed with very short, nearly golden hair, veins almost black, arculus and thyridium white, membrane not granulate, discal cell once and one-half as

long as its pedicel, fifth apical cell pointed at base, not extending on thyridial area, first apical cell for about its width on discal cell, upper branch of cubitus fractured at posterior anastomosis, the radius bent at pterostigma; hind wings uniform blackish, with nearly black veins, fourth apical cell broad at base, the third pointed.

Length 16 mm.

Colorado: South Park, August; Clear Creek, Sept. (Oslar).

Asynarchus tristis n. sp.

Face yellow; antennæ yellowish, narrowly annulate, except on basal joints, with brown, vertex black, behind yellowish, prothorax with golden pubescence and long yellow hairs; thorax dark, pale in middle, pleura yellowish, wings a uniform dirty yellowish gray, sparsely clothed with short yellowish hair, surface distinctly rugulose, veins yellowish, a brown dot in base of third apical cell, thyridium unmarked, arculus white, first subapical very long, discal cell more than twice as long as its pedicel, not concave above, inferior cubitus fractured at posterior anastomosis, upper branch continuous, fifth apical extends scarcely basad of anastomosis; hind wings uniformly faint gray, veins yellowish, fourth apical broad at base.

Length 20 mm.

South Park, Colorado, August (Oslar).

Stenophylax pacificus n. sp.

Black, with stiff black hairs; antennæ black, beyond base narrowly annulate with pale; femora, except pale tips, black, rest of legs yellowish, spines black, many on anterior face of fore tibiæ, hind tibiæ much curved, slender, fore wings blackish brown, pterostigma darker, post-cubitus and anal veins marked with dark brown, veins mostly black, a pale area on bases of apicals, except the first, pale in base and apex of first subapical, arculus pale, and an oblique pale mark starting from middle of thyridial area and reaching backward across thyridial cell, fourth subapical usually very dark, many scattered, very small, pale dots not sharply defined. Apicals of about equal width at base, except fifth, which is much narrower and extends but little basad of the anastomosis; discal cell plainly longer than its pedicel, slightly concave in front; radial vein bent at pterostigma; the cubitals fractured at the posterior anastomosis. Hind wings hyaline, veins mostly brown, pterostigma dark, fourth apical cell broad at base, discal cell slightly longer than its pedicel.

Length 15 mm.

Pullman, Washington, May (C. V. Piper).

Stenophylax antennatus n. sp.

Head yellowish, with yellow hair, antennæ yellow, basal joints long, beneath with a distinct black line; legs pale yellow, rather darker on tips, spines black, tibiæ very short; wings pale yellow, costal region unmarked, veins mostly pale, apical sectors marked with brown, wing beyond the post-cubitus and the subapicals mostly brown, somewhat irrorate with pale, surface plainly rugulose, with sparse, short, fine, pale hairs; fore wing rather long and slender, the apex obliquely truncate, discal cell a little longer than its pedicel, slightly concave in front, first apical cell much longer on discal cell than fifth apical on thyridial

area, all cells broad at anastomosis, upper cubitus fractured at posterior anastomosis, inferior branch continuous, radius much bent at pterostigma; hind wings hyaline, veins pale.

Length 20 mm.

Mt. Ranier, Washington (C. V. Piper).

Not a true *Stenophylax*, but do not desire at present to make a new genus from the one specimen, which is easily recognized by the line on basal joint of antennæ.

HOMOPHYLAX n. gen.

Spurs 1–3–4, subapical pair on hind legs unequal in size; prothorax small; wings rather broad, apex blunt-pointed, apical margin slightly rounded, the anterior and posterior anastomoses in one nearly continuous line, so that the apical cells are as far back as the subapicals, the first subapical not on thyridial area, discal cell about twice as long as pedicel, thyridial cell only a little longer, radius bent at stigma; hind wing with third apical cell narrow at base, the fourth broad. Easily distinguished from all our other Limnophilids by the position of the anterior anastomosis.

Homophylax flavipennis n. sp.

Pale yellowish throughout, clothed with yellow hair; basal joints of antennæ as long as head, well separated, more reddish; prothorax with long yellow hair; legs slender, with black spines, hind tibiæ curved, with one spine before middle, subapical spurs about twice their length before tip; wings pale yellowish hyaline, veins yellowish, uniformly clothed with short yellowish pubescence, membrane granulate, areulus and thyridium white, first apical cell broad at base, but a very short distance on discal cell.

Length 18 mm.

South Park, Colorado, Aug. (Oslar)

Halesus formosus n. sp.

Head yellowish, with nearly golden hairs above, antennæ yellowish, darker toward the tips, thorax reddish yellow, prothorax with golden hairs, legs yellowish, the tibiæ and tarsi more reddish, spines black, two small ones at tip of each anterior femur, hind femora spined nearly to base; spurs 1–3–3. Wings hyaline, marked with brown, costal area free to the dark pterostigma, tip of wing narrowly and irregularly pale, a pale area across the apicals before middle, but the apicals are dark at base, a pale area just within the anastomosis connected to a pale stripe that starts from before the pterostigma and reaches obliquely backward toward middle of the hind margin, but not crossing the post-cubitus, an oblong pale spot toward base along the anal vein, elsewhere brown, containing scattered pale circular dots; costal veins and radial sector to anastomosis pale, elsewhere the veins mostly dark; hind wings grayish on tip.

Length 22 mm.

Southwest Colorado, July (Oslar).

Potamorites virginica n. sp.

Face reddish yellow; vertex black, behind yellowish, the antennæ black; legs and palpi clear pale yellowish; tarsi darker; spines black, short; thorax and abdomen yellowish; wings uniform blackish; costal veins dark, others paler; a white dot, furcate toward base, on the thyridium, and a smaller one at the arculus; there are indistinct traces of various hyaline dots, especially in the costal and apical regions; wing with a gray fringe, quite long on the costal margin; discal cell shorter than its pedicel; membrane faintly granulate, a larger and darker granule in the base of the third apical cell; apex of wing rather broad and rounded (not obliquely truncate); hind wings broad, uniformly gray, with a gray fringe, fourth apical cell broader than third at base.

Length 13 mm.

Richmond, Virginia (Mrs. A. T. Slosson).

Evidently closely related to the European *P. biguttatus*, but with broader wings.

Chætopterygopsis parvula n. sp.

Face yellowish, vertex more brownish, nearly flat, basal joints of antennæ long, brown, rest of antennæ yellowish, joints tipped with brown, thorax dirty yellowish, legs clear yellowish, with fine black spines, rather fewer on tibiæ than usual, spurs 1–2–2; fore wings pale brownish, indistinctly irrorate with hyaline, anastomosis darker, surface distinctly rugulose, sparsely clothed with short yellow hair, a circular white spot containing a brown central dot in base of the third apical cell, veins pale, wing rather broad and short, apex rounded, discal cell nearly twice the length of its pedicel, first apical cell some distance on discal cell, fifth apical cell scarcely on thyridial cell at all, the cubital veins not fractured at posterior anastomosis; margin with a scant fringe, nearly as long on costal as on apical margin. Hind wings not much shorter than fore wings, hyaline, with yellowish veins and pubescence, a brown dot in base of third apical cell, fourth apical cell broad at base.

Length 8.5 mm.

New Brunswick, N. J. (Prof. J. B. Smith).

Notidobia americana n. sp.

Head black, with tufts of black hair from the warts on the vertex; maxillary palpi flattened and upcurved, masking the face, yellowish white, with short whitish hair; antennæ black, basal joint yellowish below, not elongate; thorax black, with black hair; legs light brown, middle and hind tibiæ and tarsi paler, spurs 2–2–4; abdomen black; the genitalia yellow; wings blackish, with much black and a little yellow pubescence; hind wings blackish, with dark gray fringe, discal cell closed, that of fore wings open; inferior appendages long, sickle-shaped, upcurved, slender at base.

Length 12 mm.

Falls Church, Virginia, June.

Heteroplectron nigripennis n. sp.

Head yellowish, with bunches of black hair each side below antennæ and behind each eye, vertex shows a blunt median ridge; palpi and antennæ black, densely black-haired; thorax dark brown, with black hair; legs black, thickly

clothed with short black hairs, spurs 2–4–4 (♀); wings uniformly blackish, somewhat shining, clothed with short black hair, veins black, fringe black; hind wings uniform blackish, with black fringe; abdomen blackish.

Length 12 mm.

Santa Maria, Puebla, Mexico (Barrett).

Heteroplectron mexicanum n. sp.

Head, palpi and antennæ black, with short black hair, a pale reddish spot on middle of vertex, prothorax above and below yellowish, rest of thorax black, with black hair; legs black, with short black hair, spurs 2–4–4 (♀); abdomen yellowish; wings uniformly blackish, sparsely clothed with short yellowish hair, veins black, fringe very short, black; hind wings much shorter, blackish, fringe black.

Length 15 mm.

Cuernavaca, Morelos, Mexico (Barrett).

Leptocella minuta n. sp.

Greenish; head and thorax clothed with white hair; antennæ white, narrowly annulate with brown; palpi and legs yellowish, with white hairs; wings hyaline, clothed with snow-white hair, and a white fringe, a few black dots beyond the anastomosis; discal cell nearly as long as the pedicel, convex above, first apical cell reaches about one-half way to the anastomosis, fifth to about two-thirds.

Length 8 mm.

Pullman, Washington (C. V. Piper).

Œcetina guttata n. sp.

Pale yellowish; head clothed with white and pale yellow hair; legs whitish; antennæ pale on base, narrowly annulate with brown, apical half darker; wings pale brown, clothed with golden scales, and with about thirty white dots, most numerous in apical part, where they usually adjoin a brown dot; fringe mostly golden, but with some brown posteriorly, anastomosis not darker than other veins; hind wings dark gray, with a brown fringe.

Length 7 mm.

New Brunswick, N. J. (J. B. Smith).

Triænodes borealis n. sp.

Dirty yellowish, verging on brown; head clothed with white hair; palpi with many black hairs; antennæ pale, narrowly annulate with brown; wings with many yellowish hairs, but with plenty of black, giving the wing a gray appearance, much darker than *T. flavescens*; sometimes two black dots on hind margin, fringe at apex mostly yellowish, but at posterior angle fuscous; hind wings pale gray, with gray fringe; venation as in *T. ignita*.

Length 12 mm.

St. Anthony's Park, Minnesota (Pettit).

Triænodes flavescens n. sp.

Yellowish; head clothed with white hair; palpi with many gray and some black hairs; antennæ white, narrowly annulate with brown; wings clothed with

golden hair, often with two black dots on the posterior margin, apical fringe wholly golden; hind wings hyaline, fringe pale gray; venation as in *T. ignita*.

Length 10 mm.

New Brunswick, N. J. (J. B. Smith); Florida (Mrs. Slosson)

Our four species of *Triænodes* may be separated by the following table:

1. Wings beyond anastomosis distinctly darker than before it.....**ignita.**
   Wings unicolorous.....2.
2. Fringe at posterior apical margin more or less fuscous.....3.
   Fringe golden.....**flavescens.**
3. Wings with mostly gray hair.....**grisea.**
   Wings with mostly yellow hairs.....**borealis.**

Triænodes ignita Walk.

Specimens have been seen from Washington, D. C.; Ithaca, N. Y.; Agric. College, Mich., and New Brunswick, N. J.

Triænodes grisea Banks.

Specimens all come from Colorado: Denver, Boulder and Clear Creek.

Hydropsyche occidentalis n. sp.

Head densely clothed with short white hair, at each posterior corner is a bunch of longer black hair; antennæ yellowish, narrowly annulate with brown, thorax clothed mostly with white hair in the middle, bunches of black on the sides; legs yellowish; wings brown, densely irrorate with white, a large area just beyond discal cell, and a large spot at arculus, apical fringe dark brown, with a few white patches; venation as usual, first apical cell usually shorter than its pedicel; hind wings gray hyaline; on the middle tibiæ the median spurs are plainly nearer to base than to tip.

Length 10 mm.

Pullman, Washington, August (C. V. Piper).

Hydropsyche grandis n. sp.

Head clothed with yellowish hair, and a bunch of black at each posterior corner; antennæ yellow, narrowly annulate with brown, clothed above with yellow hair; legs pale yellowish, spurs 2-4-4, the median pair on middle tibiæ scarcely nearer to the base than to tip; abdomen fuscous; wings yellowish hyaline, veins dark brown, surface densely irrorate with brown, usually in irregular wavy bands, beyond the anastomosis becoming very dense and occupying most of the surface, venation as in *H. scalaris*, but the first apical cell is longer, usually longer than its pedicel; hind wings pale gray; in the female the intermediate tibiæ and basal joint of tarsus is broad.

Length 16 mm.

Southwest Colorado, July (Oslar).

Our largest species of the genus and very prettily marked.

Philopotamus barrettæ n. sp.

Head black, with short yellow pubescence, above on each side is a large tuft of long black hair, three ocelli; palpi black; antennæ yellowish; thorax with yellow pubescence on middle and black on sides; legs yellowish, the femora blackish, except on tips; abdomen yellowish; fore wings brown, with large irregular patches of golden yellow hair, one near base on cubiti, several long ones along veins before and at the anastomosis, one on middle of costal margin, and several small ones along the apical margin, elsewhere with black pubescence; hind wings blackish, with black fringe.

Length 10 mm.

Jalapa, Vera Cruz, Mexico (Barrett).

Polycentropus variegatus n. sp.

Face with gray hair, above with yellowish hair, each side behind is a tuft of black hair; antennæ brown, narrowly annulate with pale, thorax with short yellow and tufts of long black hair; legs yellowish, anterior pair darker outside, spurs 3-4-4; wings with dark brown hair and many scattered patches of yellow, most numerous on apical part, where there is a round spot in apex of each cell and each side of pterostigma; venation as in *P. confusa:* hind wings gray on base, blackish on apical half.

Length 9 mm.

Pullman, Washington, July (C. V. Piper).

POTAMYIA n. gen.

A Hydropsychid near *Macronema.* No ocelli; spurs 2–4–4; antennæ long, basal joint short; maxillary palpi slender, destitute of long hair; wings rather long, with scant pubescence, discal cell closed, longer than in *Macronema,* first and fifth apical cells long pedicellate, third acute at base, no veinlet closing off base of first subapical into a median cell, and the radius does not run into the subcostal vein before tip.

Type *P. flava* Hag. (sub *Macronema*).

Rhyacophila mexicana n. sp.

Head dark brown, with some short yellow hair, behind on vertex are two oblique approximate yellowish lobes; antennæ pale yellow, darker on tips; palpi brown, long; thorax black, with bright yellow hair; legs clear yellowish, middle femora blackish, except on tips, spurs brown, 2–4–4, median pair on middle tibia much nearer to base than to tip; abdomen yellowish; wings brown, densely clothed to slightly beyond the anastomosis with short, bright, golden yellow hair, beyond with black pubescence, the costal region black, fifth apical cell with a pedicel about one-third its length; hind wings uniform blackish.

Length 10 mm.

Xico, Vera Cruz, Mexico (Barrett).

A CATALOGUE OF THE DIPTERA OF SOUTH AMERICA.

BY W. D. HUNTER, THE UNIVERSITY OF NEBRASKA.

Part I, Bibliography and Nemocera.

INTRODUCTORY.

For many years the study of the Diptera of South America has been impeded by the lack of a catalogue of the described species. The reader may gain an idea of the almost hopeless difficulty of identifying species by a glance at the bibliograpy, which contains more titles than did the bibliography of the North American Diptera, published in 1878, after more than twenty years of work and publication by Osten Sacken and Loew. Moreover, practically no groups have been monographed for that continent, and but very few for even a small district of it. A catalogue has become an absolute necessity.

The history of the cataloging of the Diptera of South America, up to the present time, is very brief. Dr. Williston has catalogued the species of the two families, Syrphidæ and Asilidæ, in the TRANSACTIONS of this Society,* and Townsend has likewise treated the *Calyptrate muscidæ* in the Annals of the New York Academy of Sciences.† Outside of these no attempt has been made to catalogue the species of any group of the South American fauna. Some years ago, however, Enrique Lynch Arribalzaga planned in an excellent manner a complete catalogue; but the plan was changed eventually so as to include only the valley of the river Plata. The untiring pains that characterizes this work, as it does all of the writings of Enrique Arribalzaga, makes it very much to be regretted that this catalogue was interrupted, as happened when the genus *Midas* was reached, and has remained incompleted. It should also be mentioned in this connection that the venerable Osten Sacken at one time started the preparation of a list of all of the exotic species of Diptera, and in the Berliner Entomologische Zeitung, for 1883, states that he hoped to complete and publish the portion dealing with the *Nemocera* soon. The advancing age of the writer has, unfortunately, prevented the realization of his hopes.

* Syrphidæ, xiii, 1886, pp. 308–324; Asilidæ, xviii, 1891, pp. 67–91.

† VII, 1892, pp. 1–44.

The present part will be followed in these TRANSACTIONS by portions dealing with the subsequent natural groups of the order. The next will include the species of the group *Homodactyla* in the sense of Brauer.

The territory covered by this catalogue is the Continent of South America north to the Isthmus of Panama, with the neighboring islands. This brings about the inclusion of the Island of St Vincent, which, although properly of the West Indian group, is not sufficiently separated from that continent to offer tangible faunal differences. It must be admitted that, in some respects, it would have been desirable to have included in this catalogue all of the West Indian and Central American species, so that with the catalogue of Osten Sacken's the whole of the two continents would have been covered. There are reasons, however, for not doing this. In the first place Osten Sacken's catalogue of 1878 included the species described up to that time from the West Indies and Mexico. At this time, the writers of the Diptera volumes of the Biologia Centrali-Americana, Williston, Osten Sacken and v. d. Wulp have furnished lists of all the species of Mexico and Central America. Moreover, in the present state of the science, nothing more than a recataloguing of these species would have been possible. St. Vincent is included not only because it is virtually an integral part of South America, but also because a great deal has been written concerning its fauna since the works mentioned were published. Thus it will be seen that with the catalogue of 1878, the Biologia Centrali-Americana, and the present work, the American continents will be covered.

The system of classification and arrangement of the families is a combination of two. For the *Brachycera* Brauer has been followed, save in the one respect of admitting the family Cœnomyidæ; and for the *Nemocera* the system suggested by Osten Sacken in the Entomologist's Monthly Magazine for May, 1891, pp. 35–39, has been adopted. In the present chaotic state of the classification of the Diptera, to accept what appears to be best from various sources, seems a defensible procedure.

Notwithstanding recent activity in the recognizing of the species described by Walker, I have invariably placed the names applied by that writer, excepting those that have been recognized, at the end of the families to which they are supposed to belong. Although

admitting the strength of the statement that the descriptions of Walker are not very much worse than those of some other writers, it is the opinion of the writer that, as Osten Sacken has demonstrated, they mean nothing. Very often several genera or even families are represented in the types of a single species. Other writers have made their mistakes, and poor and incomplete descriptions are in abundance, but no others have habitually been guilty of furnishing a description of portions of the anatomy of several species, under a name that dipterologists must now attempt to fix upon one species, in addition to the offense of faulty characterization. To place the unrecognized descriptions of this writer at the end of the various families seems to afford him as much consideration as he deserves.

It was formerly the practice of entomologists not to hesitate because they did not know from what quarter of the earth a specimen before them might have come, but to describe it forthwith. The number of such descriptions burdening the literature of Dipterology is considerable, and many doubtless apply to South American species. In this catalogue, for the convenience of the student of the South American forms, as well as of exotic Diptera in general, pains have been taken to bring all these together. They are placed at the end of the families.

At all times the writer has been under the greatest obligation to Dr. Williston. If it were not for the generous loan of any and all books in his library, including many obscure papers that it would have been impossible to obtain through the regular channels, this work could not even have been contemplated. Mr. Hugo Kahl, of the University of Kansas, has as kindly furnished most valuable assistance. He has called attention to some almost inaccessible descriptions that would probably otherwise have been missed, has offered critical suggestions on certain points, and has loaned books from his own private library. None less are thanks due to Dr. L. O. Howard for sending books from the library of the U. S. Department of Agriculture.

The writer wishes to disclaim any idea of furnishing a finality. This catalogue is preliminary, and like the catalogue of 1878 of the North American species, in no sense critical. The greatest effort has been to include all of the existing descriptions, and the writer begs anyone who notices omissions or has other criticisms to bring them to his attention.

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Amerikaansche Diptera. I, Tijdschr. Ent., xxiv, pp. 141-168, 1 plate; ii, ibid., xxiv, pp. 77-136, pl. 9, 10; ibid., xxvi, 1-60, pl. i, 2.

Langwerpige *Dexinen* vormen. Tijdschr. Ent., 28, pp. 189-200.

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DIPTERA.

Suborder ORTHORRHAPHA.

Section Nemocera.

Nemocera vera.

Family CECIDOMYIIDÆ.

CECIDOMYIA.

Meigen, Illiger's Mag., 1803.

flavida Blanch. Gay, Hist. Chile Zool. vii, 350. Philippi, chil. Dipt. 628.—Chile.

? fuscanescens Phil. chil. Dipt. 628.—Chile.

DIPLOSIS.

Loew, Dipt. Beitr. iv, 20, 1850.

pictipes Will. Dipt. St. Vincent, 253.—St. Vincent.

sp. Will. Dipt. St. Vincent, 254, pl. viii, f. 1.—St. Vincent.

sp. Will. Dipt. St. Vincent, 254.—St. Vincent.

? sp. Will. Dipt. St. Vincent, 254, pl. viii, f. 2.

ASPHONDYLIA.

Loew, Beitr. iv, 20, 1850.

sp. v. d. Wulp Tijdschr. Ent. xxiv, 142.—Argentina.

LASIOPTERA.

Meigen, Syst. Beschr. i, 70, 1851.

furcata Phil. chil. Dipt. 631.—Chile.

hieronymi Weyb. An. Agr. de la Rep. Arg. iii, 165; id. Per. Zool. iii, 62, 1878. F. Lynch A. Cat. 3.—Córdoba and Santa Fé in Argentina.

pallipes Phil. chil. Dipt. 630.—Chile.

WINNERTZIA.

Rondani, Dipt. Ital. Prodr. 1856.

Shiner, Dipt. Novara, 3, has considered this genus the same as *Asynapta* Loew.

sp. Will. Dipt. St. Vincent, 254, pl. viii, f. 6.—St. Vincent.

MIASTOR.

Meinert, Nat. Tijdschr. 3 R. iii, 156, 1864.

sp. Will. Dipt. St. Vincent, 254, pl. viii, f. 4, 4*a*.—St. Vincent.

HAPLUSA.

Karsch, Rev. Gallmücken, 15, 1878.

sp. Will. Dipt. St. Vincent, 254, pl. viii, f. 5.—St. Vincent.

LESTREMIA.

Macquart. Vide Meigen, Syst. Beschr. vi, 308, 1830.

nigra Blanch. Gay, Hist. Chil. Zool. vii, 349. Philippi, chil. Dipt. 628.—Chile.

TRICHOPTEROMYIA.

Williston, Trans. Ent. Soc. Lond. 1896, pt. iii, 255.

modesta Will. Dipt. St. Vincent, 255, pl. viii, f. 6, 6*a*, 6*b*.—St. Vincent.

Species Described by Walker.

Cecidomyia umbra Walk. Dipt. Saund. v, 421.—South America.

Dasyneura (=*Cecidomyia* [Schiner]) *nebulosa* Walk. List, iv, 1076. ?

Family MYCETOPHILIDÆ.

MYCETOBIA.

Meigen, Syst. Beschr. i, 179, 1851.

? fulva Phil. chil. Dipt. 626.—Chile.

DITOMYIA.

Winnertz, Stett. Ent. Zeit. vii. 15, 1852.

incerta Bigot, Miss. Cient. Cap Horn, Zool. vi, 16, 24, 1883. F. Lynch A. Bol. Acad. Nac. Cien. xii, 61.—Argentina.

PLESIASTINA.

Winnertz, Stett. Ent. Zeit. 1852, 55.

Centrocnemis Philippi, chil. Dipt. 619, 1865 (Schiner).

stigmata Phil. chil. Dipt. 619 (*Centrocnemis*).—Chile.

MACROCERA.

Meigen, Illiger's Mag. ii, 261, 1803.

concinna Will. Dipt. St. Vincent, 255, pl. viii, f 7.—St. Vincent.

testacea Phil. chil. Dipt. 617, F. Lynch A. Bol. Acad. Nac. Cien. xiii, 32.—Chile, Argentina.

Thomsonii F. Lynch A. Bol. Acad. Nac. Cien. xii, 31; id. Cat. 8, 12.

Macrocera fascipennis Thomson, Dipt. Eugen. Resa, 448, 1868 non Staeger, 1845 (F. Lynch A.).—Patagonia.

valdiviana Phil. chil. Dipt. 617.—Chile.

PLATYURA.

Meigen, Illiger's Mag., ii, 264, 1803.

autumnalis F. Lynch A. Bol. Acad. Nac. C. xii, 59.—Argentina.

fasciventris Will. Dipt. St. Vincent, 258, pl. viii, f. ii.—St. Vincent.
ignobilis Will. Dipt. St. Vincent, 557, pl. viii, f. 9.—St. Vincent.
macilenta F. Lynch A. Bol. Acad. Nac. C. xii, 58.—Argentina.
Miersii Westwood, Trans. Ent. Soc. Lond. v, p. 3, pl. xxiii, f. 3 (*Platyroptilon* West.).—Brazil.
parva Will. Dipt. St. Vincent, 257.
pictipennis Will. Dipt. St. Vincent, 257, pl. viii. f. 10.—St. Vincent.
rubens Wied. Anss. zw. Ins. i, 60. Macq. Dipt. Exot. i, 1, 82.—Brazil.
subannulata Phil. chil. Dipt. 620.—Chile.

CEROPLATUS.

Bosc, Act. de la Soc. d'Hist. Nat. de Paris, i, 1, 42, 1792.

longimanus Will. Dipt. St. Vincent, 258, pl. viii. f. 12.—St. Vincent.
obscurus Phil. chil. Dipt. 618, pl. xxiii. f. 8.—Chile.

NEOEMPHERIA.

Osten Sacken, Cat. 1878, 9, vice *Empheria* Winnertz, Pilzm. 102 (738), 1863, preoc.
maculipennis Will. Dipt. St. Vincent, 262, pl. viii, f. 16.—St. Vincent.
varipennis F. Lynch A. Bol. Acad. Nac. C. xii. 49 (*Empheria*); id., p. 64.—Argentina.

SCIOPHILA.

Meigen, Syst. Beschr. i, 245, 1818.

aberrans Phil. chil. Dipt. 625.—Chile.
americana Schiner, Dipt. Novara, 14.—South America.
antarctica Walker, Trans. Linn. Soc. Lond. xvii, 334, 8, 1837. F. Lynch A. Cat. 9, 18; id. Bol. Acad. Nac. C. xii, 45.
? *Sciophila vernalis* Phil. chil. Dipt. 624, 1865 (F. Lynch A.).—Patagonia.
australis Phil. chil. Dipt. 625.—Chile.
calopus Bigot, Dipt. Miss. Cap Horn, 14, pl. iii, f. 3.—Cape Horn.
chilensis Blanch. Gay, Hist. Chil. Zool. vii, 347 (1852). Phil. chil. Dipt. 624. Bigot, Dipt. Miss. Cap Horn, Zool. vi, 13, (1883). F. Lynch A. Bol. Acad. Nac. C. xii, 47.—Chile and Argentina.
clavata F. Lynch A. Bol. Acad. Nac. C. xii, 43.—Argentina.
diluta Will. Dipt. St. Vincent, 263, pl. viii, f. 17.—St. Vincent.
formosensis F. Lynch A. Bol. Acad. Nac. C. xii, 42.—Argentina.
infirma F. Lynch A. Bol. Acad. Nac. C. xii, 46.—Argentina.
obsoleta Blanch. Gay. Hist. Chil. Zool. vii, 347. Phil. chil. Dipt. 642.—Chile.
ocreator Phil. chil. Dipt. 625.—Chile.
præcox Phil. chil. Dipt. 624.—Chile.
pusilla Phil. chil. Dipt. 625.—Chile.
thoracica Phil. chil. Dipt. 624.—Chile.
tristis Bigot, Miss. Cient. Cap Horn, Zool. vi, 13, 18, pl. iii, f. 2 (1883). F. Lynch A. Bol. Acad. Nac. C. xii, 47.—Argentina.
valdiviana Phil. chil. Dipt. 624.—Chile.

LASISOMA.

Winnertz, Mongr. Pilzmücken, 748, 1863.

paranensis F. Lynch A. Bol. Acad. Nac. xii, 39.—Argentina.

TETRAGONEURA.

Winnertz, Stett. Ent. Zeit. 1846. 18.

calopus Bigot, Miss. Cient. Cap Horn, Zool. vi, 14, 19, pl. iii, f. 3 (1883). F. Lynch A. Bol. Acad. Nac. C. xii, 48 (*Sciophila*).—Argentina.

PHTHINIA.

Winnertz, Pilzmücken, 143, (779). 1863.

fraudulenta Will. Dipt. St. Vincent, 263, pl. viii, f. 18.—St. Vincent.

BOLETINA.

Staeger, Kröy. Tijdschr. 234, 1840.

Leptomorphus Walker, List, 87 (1848), (F. Lynch A.).

obscuriventris Bigot, Dipt. Miss. Cap Horn, 13, 16 (1883). F. Lynch A. Bol. Acad. Nac. C. xii, 52.

LEIA.

Meigen, Syst. Beschr. 197, 1851.

bilunula Wied. Auss. zw. Ins. i, 5. Macq. Dipt. Exot. i, 1, 81.—Brazil.

nubilipennis Walker, Trans. Linn. Soc. Lond. xvii, 334, 9 (1837). F. Lynch A. Cat. 9, 19 (1882); id. Bol. Acad. Nac. C. xii, 34.—Patagonia.

? pœciloptera Phil. chil. Dipt. 623.—Chile.

GNORISTE.

Meigen, Syst. Beschr. i, 1818.

chilensis Phil. chil. Dipt. 620, pl. xxviii, f. 9.—Chile.

NEOGLAPHYROPTERA.

Osten Sacken, Cat. 1878, vice *Glaphyroptera*.

Winnertz, Pilzmücken, 145 (781), 1863, preoc.

antarctica Bigot, Miss. Cap Horn, Zool. vi, 12, 15, pl. iii, f. 1 (1883), (*Boletina*). F. Lynch A. Bol. Acad. Nac. C. xii, 51 (*Boletina*); ibid. 64 (*Neoglaphyroptera*).—Argentina.

bipartita F. Lynch A. Bol. Acad. Nac. C. xii, 35 *Glaphyroptera*).—Argentina.

concinna Will. Dipt. St. Vincent, 259. - St. Vincent.

flavoscutellata F. Lynch A. Bol. Acad. Nac. C. xii, 36 (*Glaphyroptera*).—Argentina.

nigrospleniata F. Lynch A. Bol. Acad. Nac. C. xii 37 (*Glaphyroptera*).—Argentina.

nitens Will. Dipt. St. Vincent, 259, pl. viii, f. 13.—St. Vincent.

MANOTA.

Will. Dipt. St. Vincent, 1896.

defecta Will. Dipt. St. Vincent, 260, pl. viii, f. 14.—St. Vincent.

PROBOLÆUS.

Will. Dipt. St. Vincent, 1896.

singularis Will. Dipt. St. Vincent, 261, pl. viii, f. 15, 15*a*, 15*b*, 15*c*.—St. Vincent.

ACNEMIA.

Winnertz, Pilzmücken, 1863.

Agaricobia Philippi, chil. Dipt. 626, 1865 (Schiner).

fulvicollis Phil. chil. Dipt. 626, pl. xxiv, f. 11 (*Agaricobia*).—Chile.

MYCETOPHILA.

Meigen, Illiger's Mag., ii, 263, 1803.

apicata Phil. chil. Dipt. 622.—Chile.
atricornis Phil. chil. Dipt. 632.—Chile.
cognata Phil. chil. Dipt. 621.—Chile.
dolosa Will. Dipt. St. Vincent, 264, pl. viii, f. 20.—St. Vincent.
fascipennis Phil. chil. Dipt. 621.—Chile.
heteroneura Phil. chil. Dipt. 622.—Chile.
insipiens Will. Dipt. St. Vincent, 264, pl. viii, f. 19.—St. Vincent.
nigriventris Phil. chil. Dipt. 623.—Chile.
nodulosa Will. Dipt. St. Vincent, 264, pl. viii, f. 20.—St. Vincent.
obscuripennis Blanch. Gag. Host. Chil. Zool. vii, 546. Phil. chil. Dipt. 621.—Chile.
ornatipennis Blanch. Gay. Hist. Chil. Zool. vii, 344. Phil. chil. Dipt. 621.—Chile.
punctipennis Blanch. Gay. Hist. Chili. Zool. vii, 345. Phil. chil. Dipt. 621.
viticollis Blanch. Gay. Hist. Chil. Zool. vii, 345. Phil. chil. Dipt. 621.—Chile.
volitans F. Lynch A. Bol. Acad. Nac. C. xii, 55.—Argentina.
sp. Roeder, Dipt. Stuebel, 4.—Ecuador.
sp. Roeder, Dipt. Stuebel, 4.—Ecuador.

HYBOSCIARA.

Rübsaamen, Berl. Ent. Zeit. 1894, 28.

gigantea Rübs. l. c. 28.—Colombia.

PSEUDOSCIARA.

Schiner, Dipt. Novara, 13, 1868.

hirtella Schiner, Dipt. Novara, 14.—Colombia.

RHYNCHOSCIARA.

Rübsaamen, Berl. Ent. Zeit. 1894, 29.

villosa Rübs. l. c. 29, pl. iii, f. 24.—Venezuela, Colombia.

SCIARA.

Meigen, Illiger's Mag. ii, 263, 1803.

æqualis Rübs. Berl. Ent. Zeit. 1894, 35, pl. ii, f. 9; iii, f. 6.—Bogota.
americana Wied. Dipt. Exot. i, 33; id. Auss. zw. Ins. i, 68. Schiner, Dipt. Novara, 11. Roeder, Dipt. Stübel, 4. Osten Sacken, Biol. C. A. Dipt. i, 1.—Brazil, Colombia, Nicaragua, Costa Rica, Guatemala.
atomaria F. Lynch A. Bol. Acad. Nac. C. xii, 28.—Argentina.
atra Macq. Dipt. Exot. i, 1, 82; id. Suppl. ii, 2 (iii), 167. Bellardi, Dipt. Mess. i, 12. Osten Sacken, Cat. 1878, 12. F. Lynch A. Cat. 9, 17, 21; id. Bol. Acad. Nac. C. 117, 17, 21. Rondani, Oss. Esap. Ditt. 194. Roeder, Dipt. Stuebel, 4. F. Lynch A. Bol. Acad. Nac. C. xii, 28.
Sciara præcipua Walk. List, i, 103 (F. Lynch A.).
Plecia funebris F. Lynch A. (nec. Fabr. nec. Wied.), Nat. Arg. i, 294, 4; id. sepr. 7, 4 (F. Lynch A.).—Brazil, Cayenne, Argentina, Mexico.
cognata Walk. Cat. i, 103; id. Dipt. Saund. v, 419. Roeder, Dipt. Stuebel, 4.—Brazil, Ecuador, Madeira.

concinna Will. Dipt. St. Vincent, 266.—St. Vincent.
costalis Wied. Auss. zw. Ins. i, 68. Schiner, Dipt. Novara, ii.—Brazil.
debilis Will. Dipt. St. Vincent, 266, pl. viii, f. 22.—St. Vincent.
delecta Will. Dipt. St. Vincent, 267.—St. Vincent.
diminutiva Phil. chil. Dipt. 627.—Chile.
domestica Phil. chil. Dipt. 627.—Chile.
fasciata Walk. Ins. Saund. i, 419. Schiner, Dipt. Novara, 13.—Colombia, Brazil.
fuliginosa Blanch. Gay. Hist. Chil. Zool. vii, 348. Phil. chil. Dipt. 627.—Chile.
fulviventris Wied. Dipt. Exot. i, 44, 6; id. Auss zw. Ins. i. 67.—"America."
germana Will. Dipt. St. Vincent, 266, pl. viii, f. 21.—St. Vincent.
gigantea Macq. Dipt. Exot. Suppl. i. 147. Rond. Oss. Esap. Ditt. 194.—New Granada, Venezuela.
heteropus Phil. chil. Dipt. 627.—Chile.
infuscatipennis Blanch. Gay. Hist. Chil. Zool. vii, 348. Phil. chil. Dipt. 627.—Chile.
leptogaster Schiner, Dipt. Novara, 13.—Colombia.
marginalis Roeder, Dipt. Stuebel, 4.—Colombia.
mœbinsi Rübs. Berl. Ent. Zeit. 1894, 33, pl. i, f. 9; iii, f. 1.—Colombia.
nigrina Rübs. Berl. Ent. Ent. 1894, 25. pl. i, f. 12: iii, f. 2.—Colombia.
pallipes Blanchard, Gay's Hist. Chil. Zool. vii, 348. Rübsaamen, Berl. Ent. Zeit. 1894, 23, suggests *chilensis* for *pallipes*, which has been employed by Fabricius (Syst. Ent. iv, 243) for a *Sciara*.—Chile.
pygophora Schiner, Dipt. Novara, 13.—Colombia.
striatipennis Schiner, Dipt. Novara, 12.—Colombia.
vespertilio Schiner, Dipt. Novara, 12.—South America.
zygoneura Will. Dipt. St. Vincent, 267, pl. viii, f. 23.—St. Vincent.
sp. Will. Dipt. St. Vincent, 267.—St. Vincent.
sp. Roeder, Dipt. Stuebel, 4.—Ecuador.
sp. Roeder, Dipt. Stuebel, 4.—Ecuador.
sp. Roeder, Dipt. Stuebel, 4.—Ecuador.
sp. Roeder, Dipt. Stuebel, 4.—Ecuador.

TRICHOSIA.

Winn. Mongr. Sciarinen, 1867.

melanocephala Fabr. Syst. Antl. 60, 16. Wied. Dipt. Exot. i, 33, 2; id. Auss. zu. Ins. i, 69 (*Sciara*). Rübs. Berl. Ent. Zeit. 1894, 23, pl. iii, 621.—Surinam.

CNEPHÆOPHILA.

Philippi, chil. Dipt. 628, 1865.

fenestralis Phil. chil. Dipt. 618.—Chile.

METANGELA.

Rübsaamen, Berl. Ent. Zeit. 1894, 24.

calliptera Rübs. l. c. 24, pl. ii, f. 3; iii, f. 17.—Brazil.

ZYGONEURA.

Meigen, Syst. Beschr. vi, 304, 1830.

sciastica Will. Dipt. St. Vincent, 268, pl. viii, f. 24, 24*a*.—St. Vincent.

Species Described by Walker.

Nov. Gen. *Leiæ* similis et n. sp. Walker, Trans. Linn. Soc. London, xvii, 1837, 335.—Straits of Magellan.

Platyura ? insolita Walk. Trans. Linn. Soc. Lond xvii, 335.—Chile.

Sciara antica Walk. Dipt. Saund. v, 419.—Amazon region.

Sciara primogenita Walk. Dipt. Saund. v, 418.—Cayenne. ?

Sciara propinqua Walk. List, i, 1, 104.—Habitat unknown.

Family CULICIDÆ.

MEGARRHINA.

Rob. Desvoidy, Essai, etc., Mem. Soc. d'Hist. Nat. Paris, iii, 412, 1827.

hæmorrhoidalis Fabr. Ent. Syst. iv, 40 (*Culex*); id. Syst. Antl. 25, 8 (*Culex*). Wied. Dipt. Exot. i, 6 (*Culex*); id. Auss. zw. Ins. i, 2, 2 (*Culex*). Macq. Hist. Dipt. Suit. Buff. 1, 33, i (*Culex*). Rob. Des. Essai Culic. iii, 412, i (*Megarhinus*). Rondani et Baudi, Studi Ent. 108, 86. Rondani, Esame Ditt. Bras. 48 (*Megarhinus*). Macq. Dipt. Exot. i, 1, 32, pl. i, f. 1 (*Megarhina*). Walker, List, i, 1 (*Megarhina*). F. Lynch A. Dipt. Arg. 1891, 32, pl. iv, f. 1 (Revista del Mus. de la Plata, Tomo, i).—Brazil, Argentina, Cayenne.

portoricensis Roeder, Stett, Ent. Zeit. 1885, 337. Will. Dipt. St. Vincent, 270. pl. viii, f. 28, 28*a*.—Porto Rico, St. Vincent.

separata F. Lynch A. Dipt. Arg. Culicidæ, 33.—Argentina.

ANOPHELES.

Meigen, Syst. Beschr. i, 10, 1818.

albitarsis F. Lynch A. Descr. tres nuevos Culic. de Bs. As. in Natur., Arg. i, 150, i. F. Lynch A. Cat. 6, 6. F. Lynch A. Bol. Acad. Nac. C. iv, 114, 6; id. Dipt. Arg. Culicidæ, 36, pl. iv, f. 2.—Argentina.

annulipalpis F. Lynch A. Nat. Arg. i, 149, 1; id. Dipt. Arg. Culicidæ, 37. F. Lynch A. Bol. Acad. Nac. C. iv, 114, 6; id. Cat. 6, 6, 10.—Argentina.

annuliventris Blanch. Gay. Hist. Chil. Zool. vii, 334. Phil. chil. Dipt. 597.—Chile.

HÆMAGOGUS.

Williston, Dipt. St. Vincent, 1896.

splendens Will. Dipt. St. Vincent, 272, pl. ix, f. 31, 31*a*, 31*b*, 31c.—St. Vincent.

PSOPHORA.

Rob. Desvoidy, Essai Culicidæ. 412, 1827.

ciliata Fabr. Ent. Syst. iv. 401 (*Culex*); id. Syst. Antl. 35, 10 (*Culex*). Coquelb. Ill. Icon. Ins. 121, pl. 27, f. 7 (*Culex*). Wied. Dipt. Exot. 36, 39; id. Auss. zw. Ins. i, 3, 5 (*Culex*). St. Farg. et Serv. Encycl. Method. x, 685 (*Culex*). Macq. Suit. Buff. i, 36, 15 (*Culex*); id. Dipt. Exot. Suppl. iv, 11, pl. i, f. 1 (*Culex*). Walk. List. i, 2 (*Culex*). Osten Sacken, Cat. 1878, 18 (*Culex*). Rob. Des. Culic. 412, i (*Psorophora*). Walk. List. i, 2 (*Psorophora*). F. Lynch A. Cat. 6, 8; id. Bol. Acad. Nac. C. iv, 114, 8. F. Lynch A. Dipt. Arg. Culicidæ, 40, pl. iv, f. 3.

Culex molestus Wied. Dipt. Exot. 7, 4 (F. Lynch A.).
Culex conterrens Walk. Dipt. Saund. 427 (F. Lynch A.).—North America, Honduras, Argentina.
Holmbergii F. Lynch A. Dipt. Arg. Culicidæ, 42.—Argentina.

OCHLEROTATUS.

F. Lynch A. Dipt. Arg. Culicidæ, 43, 1891.

albifasciatus Macq. Dipt. Exot. i, 39, 4 (*Culex*). F. Lynch A. Dipt. Arg. Culicidæ, 44, pl. iv, f. 4.
? *Culex vittatus* Phil. chil. Dipt. 596 (nec Bigot), (F. Lynch A.).—Brazil, Chile, Argentina.
confimatus F. Lynch A. Dipt. Arg. Culicidæ, 46.—Argentina.

TÆNIORHYNCHUS.

F. Lynch A. Dipt. Arg. Culicidæ, 47, 1891.

tæniorhynchus Wied. Dipt. Exot. 43, i (*Culex*); id. Anss. zw. Ins. i, 8, 14 (*Culex*). Walk. List, i, 3 (*Culex*). Schiner, Dipt. Novara, 31 (*Culex*). Osten Sacken, Cat. 1878, 18 (*Culex*). F. Lynch A. Bol. Acad. Nac. C. iv, 113, 6. F. Lynch A. Dipt. Arg. Culicidæ, 48.
Culex damnosus Say, Jour. Acad. Nat. Sci. Phil. iii, 11, 3; id. Compl. Wrts. ii, 40 (F. Lynch A.).
Culex titillans Walker, List, i, 5 (F. Lynch A.).
Culex sollicitans Walker, Dipt. Saund. 427 (F. Lynch A.).—North America, Mexico, Honduras, Argentina.
confinnis F. Lynch A. Dipt. Arg. Culicidæ, 49.—Argentina.
fasciolatus F. Lynch A. Dipt. Arg. Culicidæ, 50.—Argentina.

JANTHINOSOMA.

F. Lynch A. Dipt. Arg. Culicidæ, 52, 1891.

discrucians Walk. Dipt. Saund. 430 (*Culex*). F. Lynch A. Cat. 4, 2; id. Bol. Acad. Nac. C. iv, 112 (*Culex*). F. Lynch A. Dipt.
? *oblita* F. Lynch A. Dipt. Arg. Culicidæ, 54.—Argentina.

HETERONYCHA.

F. Lynch A. Dipt. Arg. Culicidæ, 55, 1891.

dolosa F. Lynch A. Dipt. Arg. Culicidæ, 56.—Argentina.

CULEX.

Linne, Fauna Suecica, 1761.

æstuans Wied. Aass. zw. Ins. i, 11, 20.—Brazil.
annuliferus Blanch. Gay. Hist. Chil. Zool. vii, 333. Phil. chil. Dipt. 595.—Chile.
apicinus Phil. chil. Dipt. 596.—Chile.
articularis Phil. chil. Dipt. 596.—Chile.
cilipes Fabr. Syst. Antl. 34, 3. Wied. Auss. zw. Ins. i, 5, 7.—South America.
cingulatus Fabr. Syst. Antl. 36, 11. Wied. Auss. zw. Ins. i, 7, 12.—S. America.
cyaneus Fabr. Syst. Antl. 35, 9. Wied. Auss. zw. Ins. i, 6, 10.—South America.
discrucians Walk. Dipt. Saund. v, 430. F. Lynch A. Cat. 112 (4).—South America, Buenos Aires.
digitatus Rond. Esame Ditt. Bras. 49.—Brazil.
ferox Wied Aus. zw. Ins. i, 1. Macq. Dipt. Exot. Suppl. i, 135, pl. i, f. 1.—Brazil.

flavipes Macq. Dipt. Exot. i, 1, 39, 5.—Blanch. Gay. Hist. Chil. Zool. vii, 332, i, pl. i, f. 1. Phil. chil. Dipt. 595. E. Lynch A. An. Soc. Cient. Arg. x, 6, 1; id. Cat. 4, 3; id. Bol. Acad. Arg. iv, 112. F. Lynch A. Dipt. Arg. Culicidæ, 59, pl. iv, f. 7, 7*a*.

Culex serotinus Phil. chil. Dipt. 595 (F. Lynch A.).

Culex molestus Kollar, Bras. Läst. Ins. 187, f. 13. Walk. Trans. Linn. Soc. Lond. xvii, 33 (nec Wied. F. Lynch A.).—Chile, Argentina.

fulvus Wied. Auss. zw. Ins. i, 546.—Brazil.

marmoratus Phil. chil. Dipt. 597.—Chile.

molestus * Walk. Trans. Linn. Soc. Lond. xvii, 331. E. Lynch A. Cat. 112 (4). Kollar, Bras. Last. Ins. 18, f. 13.—Montevideo, Brazil.

mosquito Rob. Des. Essai, 390. Macq. S. a B. i, 35, 8. Guerin, Genera, 2, 9, pl. ii, f. 1. E. Lynch A. Cat. 4 (5); Bol. Acad. Nac. Cient. vi, 112, 5. F. Lynch A. Dipt. Arg. Culicidæ, 60, pl. iii, f. 1. Will. Dipt. St. Vincent. 272.

Culex fasciatus Wied. Auss. zw. Ins. i, 8, 13 (nec. Fabr. F. Lynch A.).

Culex frater Rob. Aesv. Essai. Osten Sacken, Cat. 1878, 19 (F. Lynch A.).—West Indies, Cuba, Jamaica, St. Vincent, Argentina.

ochripes Macq. Dipt. Suppl. iv, 315, pl. v, f. 1.—America meridionalis.

pictipennis Phil. chil. Dipt. 596. -Chile.

pipiens L. Rond. Esame Ditt. Bras. 49.—Brazil.

scapularis Rond Esame Ditt. Bras. 49—Brazil

trichopygus Wied. Auss. zw. Ins. i, 4, 6.—Brazil.

toxorhynchus Macq. Dipt. Exot. i, 1, 38.—Brazil or Chile.

variegatus Blanch. Gay. Hist. Chil. Zool. vii, 333, Phil. chil. Dipt. 595.—Chile.

violaceus Hgg. Wied. Auss. zw. Ins. i, 3, 4.—Brazil.

sp. Will. Dipt. St. Vincent,—St. Vincent.

ÆDES.

Meigen, Syst. Beschr. i, 13, 1818.

pertinans Will. Dipt. St. Vincent, 271, pl. viii, f. 29, 29*a*.—St. Vincent.

squamipennis F. Lynch A. Nat. Arg. i, 151, 3; id. Dipt. Arg. Culicidæ, 62, pl. ii, f. 8. E. Lynch A. Cat. 115 (7).—Argentina.

URANOTÆNIA.

F. Lynch A. Dipt. Argentina, Culicidæ, 63, 1891.

nataliæ F. Lynch A. Dipt. Arg. Culicidæ, 64.—Argentina.

pulcherrima F. Lynch A. Dipt. Arg. Culicidæ, 65, pl. iv, f. 4.—Argentina.

SABETHES.

Rob. Desv. Essai Tribu Culicidæ, 1827.

longipes Fabr. Syst. Antl. iv, 400, 2 (*Culex*). Wied. Auss. zw. Ins. i, 11, 546. Macq. Hist. Nat. Dipt. i, 386, 16; id. Dipt. Exot. i, 38, 3, pl. i, f. 2; id. Suppl. i, 136, pl. i, f. 2. F. Lynch A. Dipt. Arg. Culicidæ, 67.

(?) *Culex remipes* Wied. Auss. zw. Ins. i, 573. Macq. Hist. Nat. Dipt. i, 37, 18. Schiner, Dipt. Novara, 31, 5 (F. Lynch A.).

Sabethes locuples Rob. Desv. Essai Culicidæ (F. Lynch A.).—America meridionalis, Brazil, Guiana.

* Lynch states that this species may be identical with *Culex flavipes* Macq.

Species Described by Walker.*

Culex exagitans Walk. Dipt. Saund. v, 430.—Para.
Culex flavicosta Walk. Dipt. Saund. v, 431.—Amazon region.
Culex perterrens Walk. Dipt. Saund. v, 431.—South America.
Culex terrens Walk. Dipt. Saund. v, 429.—South America.
Subethes scintillans Walk. List, i, 2.—Para.

Family CHIRONOMIDÆ.

TETRAPHORA.

Philippi, chil. Dipt. 630, 1865.

fusca Phil. chil. Dipt. 630, pl. xxiv, f. 15.—Chile.

PENTANEURA.

Philippi, chil. Dipt. 629, 1865.

grisea Phil. chil. Dipt. 630. - Chile.

SPANIOTOMA.

Philippi, chil. Dipt. 629, 1865.

bivittata Phil. chil. Dipt. 629.—Chile.
unicolor Phil. chil. Dipt. 629.—Chile.

PSYCHOPHÆNA.

Philippi, chil. Dipt. 628.

pictipennis Phil. chil. Dipt. 628.—Chile.

TELMATOGEN.

Schiner, Dipt. Novara, 25, 1868.

st. pauli Schiner, Dipt. Novara, 25.—Island of St. Paul.†

CAMPTOCLADIUS.

Wulp, Tijdschr. Ent. 1874.

nigripectus Bigot, Dipt. Miss. Cap Horn, 2, pl. i, f. 1.—Cape Horn.

CHIRONOMUS.

Meigen, Illiger's Mag. ii, 260, 1803.

anonymus Will. Dipt. St. Vincent, 274.—St. Vincent.
antarcticus Walk. Trans. Linn. Soc. Lond. xvii, 332; id. List, i, 11, F. Lynch A. Cat. 7 (115).—Straits of Magellan, Patagonia.
articuliferus Blanch. Gay. Hist. Chil. Zool. vii, 336. Phil. chil. Dipt. 599.—Chile.

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* *Culex viridifrons* Walk. List, i, 3, described without locality, may also belong to the South American fauna.

† Besides the island of this name, near the equator, off the coast of Brazil, there is another in the South Indian Ocean. There is some doubt as to which Schiner means.

balteatus Phil. chil. Dipt. 600.—Chile.
bonærensis F. Lynch A. Exped. Rio Nigro, Zool. 88, 42; id. Stett. Ent. Zeit. xlvii, 189, 1881; id. Cat. 7 (115).
Chironomus proximus F. Lynch A. V. Berg. Stett. Ent. Zeit. 1881, 45. A change in name.—Argentina, Rio Colorado.
brasiliensis Wied. Auss. zw. Ins. i, 15, F. Lynch A. Cat. 7 (115).—Montevideo.
carbo Phil. chil. Dipt. 600.—Chile.
cinereus Phil. chil. Dipt. 601.—Chile.
delicatulus Phil. chil. Dipt. 600.—Chile.
eburneo-cinctus Phil. chil. Dipt. 599.—Chile.
ferrugineus Macq. Dipt. Exot. i, 1, 42.—Brazil.
holochlorus Phil. chil. Dipt. 600.—Chile.
innocuus Will. Dipt. St. Vincent, 274.—St. Vincent.
insignis Wied. Auss. zw. Ins. i, 547.—Brazil.
læteo-cinctus Phil. chil. Dipt. 600.—Chile.
lateralis Walk. Trans. Lin. Soc. Lond. xvii, 332. F. Lynch, Cat. 115 (7).—Straits of Magellan.
lindygii Schiner, Dipt. Novara, 26.—Columbia.
longimanus Will. Dipt. St. Vincent, 264, pl. ix, f. 33.—St. Vincent.
lugubris Will. Dipt. St. Vincent, 274.—St. Vincent.
maculatus Fabr. Ent. Antl. 40, 8. Wied. Auss. zw. Ins. i, 17.—South America.
maculipennis Blanch. Gay. Hist. Chil. Zool. vii. 335. Phil. chil. Dipt. 598.—Chile.
melas Phil. chil. Dipt. 600.—Chile.
obscurellus Blanch. Gay. Hist. Chil. Zool. vii, 336. Phil. chil. Dipt. 599.—Chile.
pallidulus Blanch. Gay. Hist. Chil. Zool. vii, 335. Phil. chil. Dipt. 598.—Chile.
pica Phil. chil. Dipt. 600.—Chile.
pictipennis Phil. chil. Dipt. 599.—Chile.
punctulatus Phil. chil. Dipt. 599.—Chile.
spilopterus Will. Dipt. St. Vincent, 273, pl. ix, f. 32.—St. Vincent.
tessellatus Blanch. Gay. Hist. Chil. Zool. vii, 336. Phil. chil. Dipt. 599.—Chile.
trimaculatus Macq. Dipt. Exot. i, 1, 41.—Brazil.
villosus Bigot, Dipt. Miss. Cap Horn, 3.—Cape Horn.
sp. Will. Dipt. St. Vincent, 275.—St. Vincent.

PODONOMUS.

Philippi, chil. Dipt. 601, 1865.

stigmaticus Phil. chil. Dipt. 602, pl. xxiii, f. 10.—Chile.

ORTHOCLADIUS.

Wulp, Tijdschr. Ent. 1874.

debilis Will. Dipt. St. Vincent, 275, pl. ix, f. 34.—St. Vincent.

TANYPUS.

Meigen, Illiger's Mag. ii, 261, 1893.

flaveolus Will. Dipt. St. Vincent, 275.—St. Vincent.
indecisus Will. Dipt. St. Vincent, 276, pl. ix, f. 35.—St. Vincent.

pilosus Bigot. Dipt. Miss. Cap. Horn, 3, pl. i, f. 2.—Cape Horn.
pubicornis Fabr. Syst. Antl. 43, 23 (*Chironomus*). Wied. Auss. zw. Ins. i, 18. E. Lynch A. Cat. 7 (115).—South America, Buenos Aires.

CERATOPOGON.

Meigen, Illiger's Mag ii, 1803.

chilensis Phil. chil. Dipt. 601.—Chile.
decor Will. Dipt. St. Vincent, 281, pl. ix, f. 45.—St. Vincent.
eriophorus Will. Dipt. St. Vincent, 279, pl. ix, f. 40, *a*, *b*.—St. Vincent.
flavus Will. Dipt. St. Vincent, 280, pl. ix, f. 42, 42*a*.—St. Vincent.
lituratus Will. Dipt. St. Vincent, 281.—St. Vincent.
longicornis Will. Dipt. St. Vincent, 280, pl. ix, f. 43, 43*a*.—St. Vincent.
lotus Will. Dipt. St. Vincent, 282, pl. ix, f. 47.—St. Vincent.
maculithorax Will. Dipt. St. Vincent. 277, pl. ix, f. 36.—St. Vincent.
phlebotomus Will. Dipt. St. Vincent, 281, pl. ix, f. 46, 46*a*.—St. Vincent.
propinguus Will. Dipt. St. Vincent, 279, pl. ix, f. 41, 41*a*.—St. Vincent.
pygmæus Will. Dipt. St. Vincent, 278, pl. ix, f. 37.—St. Vincent.
sequax Will. Dipt. St. Vincent, 292, pl. ix, f. 48.—St. Vincent.
thersites Will. Dipt. St. Vincent, 280, pl. ix, f. 44.—St. Vincent.
venustulus Will. Dipt. St. Vincent, 278, pl. ix, f. 38, *a*, *b*.—St. Vincent.

HEPTAGYIA.

Philippi, Chil. Dipt. 635, 1865.

annulipes Phil. l. c., 635, pl. xxiv, f. 16. Chile.*

Family PSYCHODIDÆ.

PSYCHODA.

Latreille, Precis. 1896.

alternata Say, Long's Exped. App. 358; id. Compl. Wrts. i, 242. Wied. Auss. zw. Ins. i, 23. Will. Ent. News, iv, 114; id. Dipt. St. Vincent, 283, pl. ix, f. 48. Banks, Can. Ent. xxvi, 330.—New England States, Pennsylvania, South Dakota, Kansas. St. Vincent.
angustipennis Will. Dipt. St Vincent, 285, pl. ix, f. 51.—St. Vincent.
antennalis Will. Dipt. St. Vincent, 283.—St. Vincent.
dubio Bigot, Dipt. Miss. Cap Horn, 4.—Cape Horn.
fimbriatissima Blanch. Gay. Hist. Chil. Zool. vii, 351. Phil. chil. Dipt. 631.—Chile.
hyalinata Blanch. Gay. Hist. Chil. Zool. vii, 351. Phil. chil. Dipt. 631. Bigot, Dipt. Miss. Cap Horn, 4.—Chile.
notata Blanch. Gay. Hist. Chil. Zool. vii, 551. Phil. chil Dipt. 631.—Chile.
pallens Will. Dipt. St. Vincent, 283, pl. ix, f. 50, *a*.—St. Vincent.
pulla Rond. Dipt. Exot. 90 (*Psicoda*).—Chile.
punctata Phil. chil. Dipt. 631.—Chile.
7-punctata Phil. chil. Dipt. 631.—Chile.
stellulata Loew, Beitr. ii, 1.—Brazil.
tenella Phil. chil. Dipt. 631.—Chile.

* *Chironomus hilaris* Walk. List, No. 17, described without indication of locality, perhaps, belongs here also.

PERICOMA.

Walker, Ins. Brit. ii, 256, 1856.

albitarsis Will. Dipt. St. Vincent, 284, pl. ix, f. 55.—St. Vincent.
nigropunctata Schiner, Dipt. Novara, 29.—Rio Janeiro.

Family DIXIDÆ.

DIXA.

Meigen, Syst. Beschr. i, 2, 1818.

clavulus Will. Dipt. St. Vincent, 298, pl. x, f. 73.—St. Vincent.

Family TIPULIDÆ.

MEGISTOCERA.

Wiedemanni Auss. zw. Ins. i, 55, 1828.

braziliensis Wied. Auss. zw. Ins. i, 554. O. Sacken, Berl. Ent. Zeit. 1885, 184; id. 1887, 241.—Brazil.
n. sp. ? O. Sacken, Berl. Ent. Zeit. 1886, 161.—Brazil.

BRACHYPREMNA.

Osten Sacken, Berl. Ent. Zeit. 1886, 161.

breviventris Wied. Dipt. Exot. i, 43; id. Auss. zw. Ins. i, 47, 27 (*Tipula*). Osten Sacken, Berl. Ent. Zeit. 1886, 161.—Brazil.
dispellens Walk. Trans Ent. Soc. N. S. v, 333. Osten Sacken, Berl. Ent. Zeit. 1886, 161.—Surinam?
manicata Osten Sacken, Berl. Ent. Zeit. 1887, 241.—Brazil.
pictipes Osten Sacken, Berl. Ent. Zeit. 1887, 239.—Brazil.
unicolor Osten Sacken, Berl. Ent. Zeit. 1887, 239.—Porto Rico.

CTENOPHORA.

Meigen, Illiger's Mag. ii, 263, 1803.

fuscipennis Macq. Dipt. Exot. Suppl. i, 138, pl. i, f. 4. Osten Sacken, Berl. Ent. Zeit. 1886, 169, 172. Wulp, Tijdschr, Ent. xxiii, 157.—Brazil.*

PTILOGYNA.

Westwood, Zool. Journ. v, 440, pl. xxii, f. 14, 15.

flabellifer Loew, Linn. Ent. v, 392, pl. ii, f. 1–3. Osten Sacken, Berl. Ent. Zeit. 1886, 176, 178.—Brazil.

OZODICERA.

Macq. Dipt. Exot. i, 92, 1834. Osten Sacken, Berl. Ent. Zeit. 1886, 180.

apicalis Macq. Dipt. Exot. i, 1. 52, pl. iv, f. 1. Loew. Linn. Ent. v, 389. Osten Sacken, Berl. Ent. Zeit. 1886, 180.—Brazil.
argentina Wulp, Tijdschr. Ent. xxiv, 147, pl. 15, f. 1, 2. Osten Sacken, Berl. Ent. Zeit. 1886, 180.—Argentina.

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* Osten Sacken, l. c., doubts the propriety of considering this as a South American species.

fumipennis Loew. Linn Ent. v, 389. Osten Sacken, Berl. Ent. Zeit. 1886, 180. —South America.

gracilis Westwood, Zool. Journ. v, 450; id. Lond. and Edin. Phil. Mag. 1835, 281; id. Trans. Ent. Soc. Lond. v, 181, 380. Osten Sacken, Berl. Ent. Zeit. 1886, 181.—South America.

griseipennis Loew, Linn. Ent. v, 389. Osten Sacken, Berl. Ent. Zeit. 1886, 181.—South America.

pectinata Wied. Dipt. Exot. i, 24, 4; id. Auss. zw. Ins. i, 47, 11 (*Tipula*). Loew. Linn. Ent. v, 389. Osten Sacken, Berl. Ent. Zeit. 1886, 181.—South America.

simplex Walk. Ins. Saund. 446 (*Ptilogyna*). Osten Sacken, Berl. Ent. Zeit. 1886, 181.—South America.

xanthostoma Loew, Linn. Ent. v, 389. Osten Sacken, Berl. Ent. Zeit. 1886, 180.—South America.

MACROMASTIX.

Osten Sacken, Berl. Ent. Zeit. 1886, 185. N. n. pro *Macrothorax* Jaennicke, Neue Exot. Dipt. 11, pl. i, f. 2, 1867, preoccupied in Lioy I Ditteri, 1864, 261.

chilensis Phil. chil. Dipt. 617 (*Megistocera*). Osten Sacken, Berl. Ent. Zeit. 1886, 158, 185, 187.—Chile.

TIPULA.

Linne, Anim. per Sueciam obs. 1736.

albifasciata Macq. Dipt. Exot. i, 1, 62. Blanch. Gay. Hist. Chil. Zool. vii, 338. Phil. chil. Dipt. 604.—Chile.

albimana Wied. Auss. zw. Ins. ii, 615.—Surinam.

albocostata Macq. Dipt. Exot. Suppl. i, 143.—Santa Fe in Bogota.

annulipes Phil. chil. Dipt. 605.—Chile.

apteroygne Phil. chil. Dipt. 606.—Chile.

concinna Phil. chil. Dipt. 605.—Chile.

decorata Phil. chil. Dipt. 604.—Chile.

elegans Fabr. Syst. Antl. 28, 10. Wied. Dipt. Exot. i, 26, 6; id. Auss. zw. Ins. i, 50, 15.—South America.

eluta Schiner, Dipt. Novara, 35.—Chile.

flavipennis Phil. chil. Dipt. 607.—Chile.

Frauenfeldi Schiner, Dipt. Novara, 36.—Chile.

glaphyroptera Phil. chil. Dipt. 604.—Chile.

graphica Schiner, Dipt. Novara, 36.—South America.

longipes Fabr. Syst. Antl. 25, 7. Wied. Dipt. Novara, i, 41; id. Auss. zw. Ins. i, 43, 5.—South America.

longitarsis Macq. Dipt. Exot. Suppl. i, 145, pl. ii, f. 2.—Colombia.

marmoripennis Rond. Esap. Ditt. 194.—Venezuela.

microcephala Wulp, Tijdschr. Ent. xxiv, 150, pl. 15, f. 4.—Guadeloupe.

moniliformis Roeder, Dipt. Stübel, 5.—Ecuador.

nidicornis Macq. Dipt. Exot. i, 1, 59. E. Lynch A. Cat. 123 (15).—Brazil, Buenos Aires.

nubifer Wulp, Tijdschr. Ent. xxiv, 151, pl. 15, f. 6.—Buenos Aires.

oblique-fasciata Macq. Dipt. Exot. Suppl. 1, 143, pl. i, f. 10.—New Granada.

pallidinervis Macq. Dipt. Exot. Suppl. i, 144, pl. ii, f. 1.—New Granada.

Paulseni Phil. chil. Dipt. 606.—Chile.
pictipennis Walk. Trans. Linn. Soc. London, xv.i, 333. F. Lynch A. Cat. 123 (15).—Straits of Magellan.
ruflrostris Bigot, Dipt. Miss. Cap. Horn, 5, pl. i, f. 3.—Cape Horn.
rufltigmosa Macq. Dipt. Exot. i, 1, 60. Blanch. Gay. Hist. Chil. vii, 337, pl. i, f. 3. Phil. chil. Dipt. 604.—Chile.
seticornis Macq. Dipt. Exot. Suppl. i, 144, pl. i, f. 11. Walk. Dipt. Saund. 4, 443.—New Granada, Colombia.
spilota Wied. Auss. zw. Ins. i. 553.—Brazil.
subandina Phil. chil. Dipt. 605.—Chile.
subinfuscata Will. Dipt. St. Vincent, 295, pl. x, f. 69.—St. Vincent.
trimaculata Macq. Dipt. Exot. i, 1, 59. Blanch. Gay. Hist. Chil. Zool. vii, 338, pl. i, f. 2. Philippi, chil. Dipt. 604.—Chile.
trina Wied. Analecta Ent. 11; id. Auss. zw. Ins. i, 41, 2.—Brazil.
valdiviana Phil. chil. Dipt. 606.—Chile.
vittigera Phil. chil. Dipt. 607.—Chile.

PACHYRRHINA.

Macq. Hist. Nat. Dipt. i, 88, 1834.

brasiliensis Wied. Auss. zw. Ins. i, 554, pl. v, f. 13, 14 (*Megistocera*). Osten Sacken, Berl. Ent. Zeit. 1886, 188.—Brazil.
elegans Fabr. Syst. Antl. 26, 10 (*Tipula*). Wied. Dipt. Exot. i, 26, 6 (*Tipula*); id. Auss. zw. Ins. i, 50, 15 (*Tipula*). Schiner, Dipt. Novara, 34. Wulp, Tijdschr. Ent. xxiv, 152.—South America, Argentina.
elegantula Will. Dipt. St. Vincent, 295, pl. x, f. 70.—St. Vincent.
pulchella Rond. Oss. Esap. Ditt. 195.—Insulae St. Sebastiani.
punctifrons Macq. Dipt. Exot. i, 1, 53. F. Lynch A. Cat, 124 (16).—Brazil, Buenos Aires.

NEPHROTOMA.

Bigot, Dipt. Miss. Cap. Horn, 1883

varineura Bigot, Dipt. Miss. Cap. Horn, 6, pl. i, f. 4.—Cape Horn.

DICRANOMYIA.

Stephens, Cat. Brit. Ins. 1826.

sp. ? Roeder, Dipt. Stubel, 5.—Ecuador.

GERANOMYIA.

Haliday, Ent. Mag. 1, 154, 1833.

Aprosia Macq. 1838 (Osten Sacken).
Plettusa Phil. 1865 (Osten Sacken).
Limnobiorrhynchus Westw. Ann. Soc. Ent. Fr. 1835, 683 (Osten Sacken, Berl. Ent. Zeit. 1886, 257).

canadensis Westwood, Osten Sacken, Mongr. iv, 80; id Cat. 1878, 25, F. Lynch A. Cat. 121 (13).
Limnobiorrhynchus canadensis Westw. Lond. and Edinb. Phil. Mag. Ser. iii, vi; id. Isis, ii (1838).
Geranomyia communis Osten Sacken, Proc. Acad. Nat. Sci. Phil. 1859, 207 F. Lynch A.).—Canada, United States, Buenos Aires.
fulvithorax Phil. chil. Dipt. 589.—Chile.

pallida Will. Dipt. St. Vincent, 284, pl. ix, f. 43.—St. Vincent.
rostrata Say, Journ. Acad. Nat. Sci. Phil. iii, 22 (*Limnobia*). Wied. Auss. zw. Ins. i, 35 (*Limnobia*). Osten Sacken, Proc. Acad. Nat. Nat. Phil. 1859, 207; id. Mongr. iv. 79. Will. Dipt. St. Vincent, 285.—Atlantic States, Canada, Cuba, St. Vincent.
stigmatica Phil. chil. Dipt. 598 (*Plettusa*).—Chile.
testacea Phil. chil. Dipt. 598 (*Plettusa*). Chile.
virescens Phil. chil. Dipt. 597, pl. xxiii, f. 1 (*Plettusa*).—Chile.
sp. Will. Dipt. St. Vincent, 285.—St. Vincent.

RHIPIDIA.

Meigen, Syst. Beschr. i, 1818.

bipectinata Will. Dipt. St. Vincent, 285, pl. ix, f. 54.—St. Vincent.
costalis Will. Dipt. St. Vincent, 286, pl. ix, f. 56.—St. Vincent.
subpectinata Will. Dipt. St. Vincent, 287. pl. ix, f. 57; pl. x, f. 57*a*.—St. Vincent.
unipectinata Will. Dipt. St. Vincent, 586, pl. ix, f. 55.—St. Vincent.
sp. ? Will. Dipt. St. Vincent, 297, pl. x, f. 72, 72*a*.—St. Vincent.

PERIPHEROPTERA.

Schiner, Dipt. Novara, 47, 1868.

abberans Schiner, Dipt. Novara, 43 (*Rhamphidia*). Osten Sacken, Berl. Ent. Zeit. 1887, 258.—South America.
incommoda Osten Sacken, Berl. Ent. Zeit. 1887, 260.—Brazil.
nitens Schiner, Dipt. Novara, 47. Osten Sacken, Berl. Ent. Zeit. 1887, 259.—Colombia.
Schineri Osten Sacken, Berl. Ent. Zeit. 1887, 261.—Brazil

LIMNOBIA.

Meigen, Syst. Beschr. i, 92, 1818.

acrostacta Wied. Dipt Exot. i, 14, 4; id. Auss. zw. Ins. i, 26. Macq. Dipt. Exot. Suppl. i, 146, pl. ii, f. 6.—Java (Wied), Brazil ? (Macq.).
adspersa Wied. Auss. zw. Ins. i, 550.—Brazil.
bifasciata Fabr. Syst. Antl. 31, 38 (*Tipula*). Wied. Auss. zw. Ins. i, 36, 22.—South America.
caminaria Wied. Auss. zw. Ins. i, 31, 13.—Brazil.
chlorotica Phil. chil. Dipt. 614.—Chile.
decasbila Wied. Auss. zw. Ins. i, 549.—Brazil.
diva Schiner, Dipt. Novara. 46.– Brazil.
elquiensis Blanch. Gay. Hist. Chil. Zool. vii, 341. Phil. chil. Dipt. 612.—Chile.
erythrocephala Fabr. Syst. Antl. 31, 35 (*Tipula*). Wied. Auss. zw. Ins. i, 30, 11.—South America.
fasciolaris Wied. Auss. zw. Ins. i, 552.—Brazil.
flaviceps Wied. Auss. zw. i, 550. Walk. Dipt. Saund. v, 436.– Brazil.
flavida Phil. chil. Dipt. 612.—Chile.
flavithorax Wied. Auss. zw. Ins. i, 37, 23.—Brazil.
guttata Phil. chil. Dipt. 613.—Chile.
infumata Phil. chil. Dipt. 613.—Chile.
insularis Will. Dipt. St. Vincent, 287. pl. x, f. 58.—St. Vincent.
lineicollis Blanch. Gay. Hist. Chil. Zool. vii, 341. Phil. chil. Dipt. 612. Bigot, Dipt. Miss. Cap Horn, 8.—Chile.

longicollis Bigot, Dipt. Miss. Cap Horn, 8, pl. ii, f. 2.—Cape Horn.
longimana Fabr. Syst. Antl. 26, 11 (*Tipula*). Wied. Dipt. i, 13, 2; id. Auss. zw. Ins. i, 24, 2.—South America.
maculata Fabr. Syst. Antl. 30, 29 (*Tipula*). Wied. Auss. zw. Ins. i, 29, 10.—South America.
melanacra Wied. Auss. zw. Ins. i, 548.—Brazil.
melanocephala Fabr. Ent. Syst. iv. 241, 33; id. Syst. Antl. 30, 32 (*Tipula*). Wied. Dipt. Exot. i, 18, 8; id. Auss. zw. Ins. i, 34, 18, 548.—Cayenne.
multipunctata Fabr. Syst. Antl. 31, 19. Wied. Auss. zw. Ins. i, 575.—South America.
nigrina Wied. Auss. zw. Ins. i, 37, 24.—Brazil.
obscura Fabr. Syst. 27, 18 (*Tipula*). Wied. Dipt. Exot. i, 12, 1; id. Auss. zw. Ins. i, 24, 1.—South America.
ocellata Roeder, Dipt. Stuebel, 5.—Ecuador.
ornatipennis Blanch. Hist. Chil. Zool. vii, 342. Phil. chil. Dipt. 612.—Chile.
pallida Macq. Dipt. Exot. i, 1, p. 76. Blanch. Gay. Hist. Chil. Zool. vii, 340. Phil. chil. Dipt. 612.—Chile.
phatta Phil. chil. Dipt. 614.—Chile.
polysticta Phil. chil. Dipt. 613.—Chile.
punctatissima Wied. Auss. zw. Ins. i, 30, 12.—Brazil.
simplex Wied. Auss. zw. Ins. i, 549.—Brazil.
stictica Blanch. Gay. Hist. Chil. Zool. vii, 342. Phil. chil. Dipt. 612.—Chile.
stigmatica Blanch. Gay. Hist. Chil. Zool. vii, 841. Phil. chil. Dipt. 612.—Chile.
tænioptera Wied. Auss. zw. Ins. i, 28, 9.—Brazil.
varia Wied. Auss. zw. Ins. i, 573.—Brazil.
venezuelenis Macq. Dipt. Exot. Suppl. i, 147, pl. ii, f. 7.—Venezuela.
vernalis Phil. chil. Dipt. 612.—Chile.
sp. ? Roeder, Dipt. Stuebel, 5.—Ecuador.

RHAMPHIDA.

Meigen, Syst. Beschr. vi, 281, 1830.

albitarsis Osten Sacken, Berl. Ent. Zeit. xxxi, 184, 1887. Will. Dipt. St. Vincent, 288, pl. x, f. 59, 59*a*.—Porto Rico, St. Vincent.
scapularis Macq. Dipt. Exot. i, 1, 77, pl. x, f. 1.—Brazil.

ELEPHANTOMYIA.

Osten Sacken, Proc. Acad. Nat. Sci. Phil. 1859.

longirostris Will. Dipt. St. Vincent, 288.—St. Vincent.

TOXORRHINA.

Loew, Linn. Ent. v, 400, T. ii, f. 17, 1851.

brasiliensis Westw. Trans. Ent. Soc. Lond. 1881, 385 (*Limnobiorhynchus*). Osten Sacken, Berl. Ent. Zeit. 1887, 257.—Brazil.

DIOTREPHA.

Osten Sacken, Cat. N. A. Dipt. 1878, 27, 219, note, 28.

concinna Will. Dipt. St. Vincent, 291, pl. x, f. 66.
? mirabilis Osten Sacken, Cat. Dipt. 1878, 220. Will. Dipt. St. Vincent, 291, pl. x, f. 65, 65*a*. Georgia, Texas, Cuba, St. Vincent.

ELLIPTERA.

Schiner, Wien. Ent. Monatschr. vii, 222, 1863.

? sp. Will. Dipt. St. Vincent, 290, pl. x, f. 64.—St. Vincent.

ATABARBA.

Osten Sacken, Mongr. N. A. Tipulidæ, iv, 127, 1868.

pleuralis Will. Dipt. St. Vincent, 289, pl. x, f. 61, *a*, *b*, *c*.—St. Vincent.
puella Will. Dipt. St. Vincent, 288, pl x, f. 60.—St. Vincent.

TEUCHOLABIS.

Osten Sacken, Proc. Acad. Nat. Sci. Phil. 1859.

annulata Will. Dipt. St. Vincent, 290, pl. x, f. 63.—St. Vincent.
complexa Osten Sacken, Proc Acad. Nat. Sci. Phil. 1859, 223; id. Mongr. iv, 129. Will. Dipt. St. Vincent, 289, pl. x, f. 62.—St. Vincent.
flavithorax Wied. Auss. zw. Ins. i, 37, 23 (*Limnobia*). Schiner, Dipt. Novara, 43.—South America.
morionella Schiner, Dipt. Novara, 47 (*Limnobia*). Osten Sacken, Mongr. iv, 57; id. Berl. Ent. Zeit. xxxi, 1887, 257.—South America.
polita Osten Sacken, Berl. Ent. Zeit. 1887, 273.
spiniger Schiner, Dipt. Novara, 44.—Colombia.

PARATROPESA.

Schiner, Verh. Z. B. Ges. 1866, 932.

collaris Osten Sacken, Berl. Ent. Zeit, 1887, 274.—Amazon.
singularis Schiner, Dipt. Novara, 46.—Colombia.

POLYMORIA.

Philippi, Verh. Z. B. Ges. 1865, 615.

inerea Phil. chil. Dipt. 609.—Chile.
irrorata Phil. chil. Dipt. 608, pl. xxiii, f. 3.—Chile.
lutea Phil. chil. Dipt. 608.—Chile.
punctipennis Phil. chil. Dipt. 609.—Chile.
tenella Phil. chil. Dipt. 609.—Chile.

LACHNOCERA.

Philippi, Verh. Z. B. Ges. 1865, 615.

delicatula Phil. chil. Dipt. 616, pl. xxiii, f. 5.—Chile.

ERIOPTERA.

Meigen, Illiger's Mag. ii, 1803.

annulipes Phil. chil. Dipt. 294.—Chile.
caloptera Say, Journ. Acad. Nat. Sci. Phil. iii, 17; id. Compl. Wrts. ii, 44. Wied. Auss. zw. Ins. i, 23. Osten Sacken, Proc. Acad. Nat. Sci. Phil. 1859, 226; id. Mongr. iv, 161, pl. iv, f. 15. Will. Dipt. St. Vincent, 294.—Atlantic States, Kansas, Colorado, Canada, Cuba, St. Vincent.
hirsutitipes Macq. in Webb et Berth. Hist. Nat. des Canaries, 1835; id. Dipt. Exot. i, 1, 69 (*Limnobia*). F. Lynch A. Cat. 121, 13 (*Mesocyphona*).
Limnobia reciproca Walk. List, i, 50 (F. Lynch A.).
? *Limnobia obscurata* Blanch. Gay. Hist. Chil. Zool. vii, 343. Phil chil. Dipt. 612 (F. Lynch A.).

Ilisia hirsutipes Macq. Rond. Dipt. Exot. 91 (F. Lynch A.).

? *Limnophila trichopus* Phil. chil. Dipt. 610 (F. Lynch A.).—Canaries, Montevideo, Chile, Buenos Aires.

? **longipes** Phil. chil. Dipt 616.—Chile.

? **pallida** Phil. chil. Dipt. 616.—Chile.

uniformis Blanch. Gay. Hist. Chil. Zool. vii, 343. Phil. chil. Dipt. 616.—Chile.

GONIOMYIA.

Megerle, apud Meigen, Syst. Beschr. i, 146, 1818.

? **antarctica** Walk. Trans. Linn. Soc. Lond. xvii, 332. F. Lynch A. Cat. 123 (15).—Straits of Magellan.

TRIMICRA.

Osten Sacken, Proc. Acad. Nat. Sci. Phil. 1861, 290; id. Mongr. iv, 165, pl. ii, f. 1.

antarctica Schiner, Dipt. Novara, 42.—Island of St. Paul.

st. pauli Schiner, Dipt. Novara, 43.—St. Paul.

SYMPLECTA.

Meigen, Syst. Beschr. vi, 282, 1830.

Ideoneura Phil. Verh. Z. B. Ges. 1865, 615, pl. xxiii, f. 4. Preoc. Selys, Neuropt. (O. S.).

Helobia St. Farg. Encycl. Meth. x, 385, 1825 (O. S.).

macroptera Phil. chil. Dipt. 615, pl. xxiii, f. 4 (*Ideoneura*). Osten Sacken, Berl. Ent. Zeit. 1887, 197.—Chile.

GNOPHOMYIA.

Osten Sacken, Proc. Acad. Nat. Sci. Phil. 1859; id. Mongr. iv, 172, pl. ii, f. 5, pl. iv, f. 19, 19*a*.

Furina Jaenn. Neue Exot. Dipt. 318, 1867 (O. S.).

caloptera Osten Sacken, Berl. Ent. Zeit. 1887, 284.—Brazil.

fascipennis Osten Sacken, Berl. Ent. Zeit. 1887, 283.—Amazon.

rufithorax Wied. Auss. zw. Ins. i, 548 (*Limnobia*).—Brazil.

MONOGOMA.

Westwood, Trans. Ent. Soc. Lond. 1881, 364. Will. Dipt. St. Vincent, 291.

manca Will. Dipt. St. Vincent, 293.—St. Vincent.

pallida Will. Dipt. St. Vincent, 293, pl. x, f. 69.—St. Vincent.

SIGMATOMERA.

Osten, Sacken, Mongr. iv, 137, 1869.

amazonica Westw. Trans. Ent. Soc. Lond. 1881, 366, pl. 17, f. 3. Osten Sacken, Berl. Ent. Zeit. 1887, 289.—Brazil.

LECTERIA.

Osten Sacken, Berl. Ent. Zeit. 1887, 207.

circinata Osten Sacken, Berl. Ent. Zeit. 1887, 292.—South America.

delicatula Osten Sacken, Berl. Ent. Zeit. 1887, 893.—Colombia.

histrio Schiner, Dipt. Novara, 41.—Colombia.

Sackeni Will. Dipt. St. Vincent, 294, pl. x, f. 68.—St. Vincent.

solatrix Osten Sacken, Proc. Acad. Nat. Sci. Phil. 1859, 238 (*Limnophila*). F. Lynch A. Cat. 122 (14).—Brazil, Buenos Aires, United States, N. A.

POECILOSTOLA.

Bigot, Dipt. Miss. Cap Horn, 1883.

flavicauda Bigot, Dipt. Miss. Cap Horn, 10, pl. ii, f. 4.—Cape Horn.

LIMNOPHILA.

Macquart, Hist. Nat. Dipt. i, 1834.

apoecila Phil. chil. Dipt. 611.—Chile.
chilensis Blanch. Gay. Hist. Chil. Zool. vii, 339. Phil. chil. Dipt. 610.—Chile.
cineracea Phil. chil. Dipt. 611.—Chile.
eutæniata Bigot, Dipt. Miss. Cap Horn, 9, pl. ii, f. 3.—Cape Horn.
? pallens Phil. chil. Dipt. 610.—Chile.
stigmatica Phil. chil. Dipt. 610.—Chile.
trichopus Phil. chil. Dipt. 610.—Chile.
venosa Phil. chil. Dipt. 611.—Chile.
verecunda Phil. chil. Dipt. 611.—Chile.

CTEDONIA.

Philippi, chil. Dipt. 602, 1865. Osten Sacken, Berl. Ent. Zeit. 1886, 178.

bicolor Phil. chil. Dipt. 603, pl. xxiii, f. 2. Osten Sacken, Berl. Ent. Zeit. 1886, 179.—Chile.
bipunctata Phil. chil. Dipt. 603.—Chile.
flavipennis Phil. chil. Dipt. 602. Osten Sacken, Berl. Ent. Zeit. 1886, 179; id. 1887, 213.

? *Gyroplistia fusca* Jaenn. Neue Exot. Dipt. 322 (Osten Sacken).—Valdivia.

pictipennis Phil. chil. Dipt. 603.—Valdivia.

POLYMERA.

Wied. Auss. zw. Ins. i, 57, 1828.

albitarsis Will. Dipt. St. Vincent, 296, pl. x, f. 71, 71*a*, 71*b*.—St. Vincent.
fusca Wied. Dipt. Exot. i, 44, 5; id. Auss. zw. Ins. i, 58, 2, 554.—Brazil.
hirticornis Fabr. Syst. Antl. 46, 39 (*Chironomus*). Wied. Dipt. Exot. i, 37 et 41; id. Auss. zw. Ins. i, 57, 1.—South America.
obscura Macq. Dipt. Exot. i, 1, 69, pl. viii.—Brazil.

ISCHNOTHRIX.

Bigot, Dipt. Miss. Cap Horn, 1883.

ætherea Bigot, Dipt. Miss. Cap Horn, 7, pl. ii, f. 1.—Cape Horn.

ERIOCERA.

Macq. Dipt. Exot. i, 1, 74, pl. 10, f. 2, 1838. O. Sacken, Berl. Ent. Zeit, 1887, 220.

Eranioptera Guerin, Noy. Coq. Zool. ii, 287, pl. xx, f. 1838 (Osten Sacken).
Caloptera Guerin, on the plate (Osten Sacken).
Ptericosmus Walk. List. 1, 78, 1848 (Osten Sacken).
Allarthmia Loew. Bernst. 1850, 38 (Osten Sacken).
Oligomera Voleschall, Nat. Tijdschr. xiv, 387, pl. vii. f. 3, 1857 (Osten Sacken).
Physecrania Bigot, Ann. Soc. Ent. Fr. 1859, 123, pl. iii, f. 1, 1859 (Osten Sacken).
Ex parte *Arrhenica* Osten Sacken, Proc. Acad. Nat. Sci. Phil. 1859, 243 (Osten Sacken).

caminaria Wied. Auss. zw. Ins. i, 79, 3. Schiner, Dipt. Novara, 42.—Brazil.

erythrocephala Fabr. Syst. Antl. 31, 35 (*Tipula*). Wied. Auss. zw. Ins. i, 30, 11 (*Limnobia*). Macq. Dipt. Exot. i, 67, 1 (*Cylindrotoma*). Schiner, Dipt. Novara, 41.—South America.

fuliginosa Osten Sacken, Proc. Acad. Nat. Sci. Phil. 1859, 243; id. Mongr. iv. 255. Wulp. Tijdschr. Ent. xxiv, 153.—District of Columbia, Virginia; Colombia (Wulp).

nigra Wied. Auss. zw. Ins. i, 27, 6 (*Limnobia*). Macq. Dipt. Exot. i, 1, 79, pl. x, f. 2.—Brazil.

PENTHOPTERA.

Schiner, Wien. Ent. Monat. vii, 1863, 220.

fuliginosa Schiner, Dipt. Novara, 42. Colombia, Osten Sacken, Berl. Ent. Zeit. 1887, 224, surmises that this is a species of *Eriocera*.

AMALOPIS.

Hald. in Walk. Ins. Brit. Dipt. iii, xv, 1856. O. Sacken, Berl. Ent. Zeit. 1887, 227.

Crunobia Kolenati, Wien. Ent. Mon. iv, 391, 1860 (Osten Sacken).

Ex parte *Tricyphona* Zett. Ins. Lapp. 1840 (Osten Sacken).

Bophrosia Rond. Prodr. i, 1856, 183 (V. Osten Sacken, l. c.).

? *Nasterna* Wallengren, Ent. Tijdschr. 1881, 179, 191 (Osten Sacken).

pusilla Bigot, Dipt. Miss. Cap Horn, 10 (*Tricyphona*).—Cape Horn.

CYLINDROTOMA.

Macquart, Hist. Nat. Dipt. i, 1834.

erythrocephala Linn. Macq. Dipt. Exot. i, 1, 71.—Brazil.

hyaloptera Phil. chil. Dipt. 614.—Chile.

ruficornis Macq. Dipt. Exot. i, 2, 292.—Brazil.

PTYCHOPTERA.

Meigen. Illiger's Mag. 1803, ii, 262. Weyenbergh, Nap. La Republica Argentina, 1876, 167. Lynch, Bol. Acad. iv, 123. O. Sacken, Berl. Ent. Zeit. 1887, 227.

TANYDERUS.

Philippi, Verh. Z. B. Ges. 1865, 780, pl. xxix, f. 57.

pictus Phil. l. c. Osten Sacken, Berl. Ent. Zeit. 1887, 228.—Chile.

Species Described by Walker.

Geranomyia pilipes Walk. Dipt. Saund. v, 440.—Amazon.

Gonomyia ? variegata Walk. Trans. Linn. Soc. Lond. xvii, 333.—St. Paul in Brazil.

Limnobia calopus Walk. Dipt. Saund. v, 439.—South America.

" *chrysoptera* Walk. Dipt. Saund. v, 437.—South America.

" *reciproca* Walk. List, i, 50. Montevideo.

" *tenebrosa* Walk. Dipt. Saund. v, 439.—South America.

Pachyleptus fasciatus Walk. Dipt. Saund. v, 426.—South America.

Ptilogyna simplex Walk. Dipt. Saund. v, 446.—South America.

Tipula filigera Walk. Dipt. Saund. v, 443.—South America.

" *gracilipes* Walk. Trans. Linn. Soc. Lond. xvii, 333.—St. Paul in Brazil.

The habitat of the following species is unknown; probably some of them are South American.

Ctenogyna bicolor Macq. Dipt. Exot. i, 1, 47, pl. ii, f. 2.
Limnobia bituberculata Macq. Dipt. Exot. i, 1, 76, pl. 6, f. 2.
Megistocera limbipennis Macq. Dipt. Exot. i, 1, 64.
Pachyrhina elongata Macq. Dipt. Exot. i, 1, 54, pl. iv, f. 2.
Ctenophora constans Walk. Dipt. Saund. v, 448.

NEMOCERA ANOMALA.

Family BIBIONIDÆ.

SCATOPSE.

Geoffroy, Hist. Nat. Ins. ii, 545. 1764.

atrata Say, Long's Exped. ii, App. x, 367; id. Compl. Wtrs. i, 250. Wied. Auss. zw. Ins. i, 71. Osten Sacken, Cat. 1878, 16. F. Lynch A. Nat. Arg. i, 299. F. Lynch A. Cat. 120 (12).
Scatopse recurva Loew. Linn. Ent. i, 330, pl. iii, t. 4. Sillim. Journ. xxxvii, 317 (E. Lynch A.).—Europe, United States, Buenos Aires.

carbonaria Phil. chil. Dipt. 640. F. Lynch A. Cat. 120 (12).
"*Scatopse fulvitarsis* Macq." F. Lynch A. Nat. Arg. i, 299 (F. Lynch A.).—Chile, Buenos Aires.

carolina Blanch. Gay. Hist. Chil. Zool. vii, 359. Phil. chil. Dipt. 640.—Chile.

hyalinata Phil. chil. Dipt. 640.—Chile.

pallidipes F. Lynch A. Nat. Arg. i, 298; id. Cat. 120 (12).—Buenos Aires.

parvula Blanch. Hist. Chil. vii, 359. Phil. chil. Dipt. 640.—Chile.

pygmæa Loew, Centur. v, 13. Will. Dipt. St. Vincent, 269, pl. viii, f. 26.—St. Vincent, District of Columbia.

transatlantica Phil. chil. Dipt. 640.—Chile.

DILOPHUS.

Meigen, Illiger's Mag. ii, 264, 1803.

bicolor Wied. Dipt. Exot. 34; id. Auss. zw. Ins. i, 76. Macq. Dipt. Exot. i, 1, 89. F. Lynch A. Cat. 118 (10).—Montevideo (Macq.), Cape (Wied.).

collaris Guer. Icon. Regne, vii, 535, pl. 93, f. 7. F. Lynch A. Cat. 119 (11).
Dilophus thoracicus Guer. l. c. tab. aliq. exempl. Walk. List, 1, 118 (F. Lynch A.).—Montevideo.

giganteus Macq. Dipt. Exot. Suppl. i, 149, pl. ii, f. 2.—New Granada.

lucifer Schiner, Dipt. Novara, 18.—Colombia.

maculipennis Blanch. Gay. Hist. Chil. Zool. vii, 354. Phil. chil. Dipt. 635.—Chile.

nigripes Blanch. Gay. Hist. Chil. Zool. vii, 354. Phil. chil. Dipt. 635. Bigot. Dipt. Miss. Cap Horn, 17.—Chile.

pallidipennis Phil. chil. Dipt. 636.—Chile.

Paulseni Phil. chil. Dipt. 636.—Chile.

pectoralis Wied. Auss. zw. Ins. i, 76. F. Lynch A. Cat. 119 (11).
Dilophus similis Rond. Dipt. Aliquot. Oscul. 17, 39. F. Lynch A. Nat. Arg. i, 296 (F. Lynch A.).—Montevideo, Buenos Aires.

pictus Schiner, Dipt. Novara, 19.—Colombia.

tapir Schiner, Dipt. Novara, 18.—Colombia.
testaceipes Blanch. Gay. Hist. Chil. Zool. vii, 355. Phil. chil. Dipt. 635.—Coquimbo.
thoracicus Say, Jour. Acad. Sci. Phil. iii, 80. Wied. Auss. zw. Ins. i, 77. Osten Sacken, Cat. 1878, 16. Wulp, Tijdschr. Ent. xxiv, 146.—Pennsylvania, Maryland; Montevideo (Wulp).
trisulcatus Macq. Dipt. Exot. i, 1, 92. Wulp, Tijdschr. Ent. xxiv, 146.—Brazil, Argentina.
rufipes Blanch. Gay. Hist. Chil. Zool. vii, 355. Phil. chil. Dipt. 636.—Coquimbo.
valdivianus Phil. chil. Dipt. 636.—Chile.
vittatus Phil. chil. Dipt. 636.—Valdivia.

ACANTHOCNEMIS.

Blanch. Gay. Hist. Chil. Zool. vii, 355.

ater Phil. chil. Dipt. 638.—Chile.
bimaculatus Phil. chil. Dipt. 638.—Chile.
carbonarius Phil. chil. Dipt. 638.—Chile.
castanipes Bigot, Miss. Cap. Horn, 17.—Cape Horn.
dorsalis Phil. chil Dipt. 639.—Chile.
ephippium Phil. chil. Dipt. 638.—Chile.
gagantinus Phil. chil. Dipt. 638.—Chile.
hyalipennis Blanch. Gay. Hist. Chil. Zool. vii, 358. Phil. chil. Dipt. 637.—Chile.
immaculatipennis Blanch. Gay. Hist. Chil. Zool. vii, 358. Phil. chil. Dipt. 637.—Chile.
lateralis Phil. chil. Dipt. 638.—Chile.
luteicollis Phil. chil. Dipt. 637.—Chile.
macrorhinus Macq. Dipt. Exot. i, 2, 294 (*Dilophus*). Blanch. Gay. Hist. Zool. 357, pl. i, f. 4. Phil. chil. Dipt. 637.—Coquimbo.
nigripennis Phil. chil. Dipt. 637.—Chile.
obscurus Blanch, Gay. Hist. Chil. Zool. vii, 357. Phil. chil. Dipt. 637.—Chile.
pallens Blanch. Gay. Hist. Chil. Zool. vii, 357. Phil. chil. Dipt. 637. Schiner. Dipt. Novara, 19 (*Dilophus*).—Chile, Colombia.
thoracicus Phil. chil. Dipt. 637.—Valdivia.
rubricollis Blanch. Gay. Hist. Chil. Zool. vii, 356. Phil. chil. Dipt. 637.—Chile.
rubripes Phil. chil. Dipt. 639.—Chile.

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Geoffroy, Hist. Nat. Ins. ii, 571, 3, 1764.

abbreviatus Wulp, Tijdschr. Ent. xxiv, 145.—Argentina.
antarcticus Walk. Trans. Linn. Soc. Lond. xvii, 336. F. Lynch A. Cat. 118 (10).—Straits of Magellan.
dispar Schiner, Dipt. Novara, 20.—Colombia.
intermedius Rons. Oss. Esap. Ditt. 193.—Venezuela.
nudioculatus Macq. Dipt. Exot. Suppl. ii, 1, 26.—Brazil.
subæqualis Rond. Dipt. Aliq. Oscul. 16, 38. F. Lynch A. Nat. Arg. i, 297. F. Lynch A. Cat. 118 (10).—Buenos Aires.
superfluus Schiner, Dipt. Novara, 20. Osten Sacken, Dipt. Biol. C. A. i, 3.—Colombia.
vicinus F. Lynch A. Nat. Arg. i, 297. F. Lynch A. Cat. 118 (10).—Buenos Aires.

PLECIA.

Wied. Auss. zw. Ins. i, 72, 1823.

collaris Fabr. Syst. Antl. 54, 12 (*Hirtea*); Syst. Ant. 163, 32 (*Laphria thoracica*). Wied. Dipt. Exot. i, 32, 3; id. Dipt. Auss. zw. Ins. i. 74. Rondani, Esame Ditt. Bras. 48, xxx. Schiner, Dipt Novara, 21. Walk. Trans. Linn. Soc. Lond. xvii, 335. F. Lynch A. Cat. 118 (10).—S. America, Colombia.

costalis Walk. Dipt. Saund. v. 422. Roeder, Dipt. Stuebel, 4.—Colombia, Ecuador.

costalis Wied. Auss. zw. Ins. ii. 618.—Brazil.

discolor Wulp, Tijdschr. Ent. xxiv, 143.—Argentina.

femorata Macq. Dipt. Exot. i, 1, 90, pl. xii, f. 3.—Brazil.

funebris Fabr. Syst. Antl. 54, 14 (*Hirtea*). Wied. Dipt. Exot. 1, 32, 4; id. Auss. zw. Ins. i. 74. Macq. Dipt. i, 1, 90. Rondani, Esame, Ditt. Bras. 48; id. Oss. Esap. Ditt. 193. Roeder, Dipt. Stuebel, 4. Schiner, Dipt. Novara, 21. F. Lynch A. Notas Dipt. Bib. 298 (7).—South America, Colombia, Venezuela, Buenos Aires.

imperialis Schiner, Dipt. Novara, 22.—Colombia.

minor Jaennicke, Neue Exot. Dipt. 318.—Brazil.

plagiata Wied. Anal. Ent. 11; id. Auss. zw. Ins. i, 75. Schiner, Dipt. Novara, 22. Osten Sacken, Dipt. Biol. C. A. i, 2.

Plecia heteroptera Macq. Dipt. Exot. Suppl. i, 149, 8, pl. ii, f. 10 (Schiner).

Plecia vittata Bellardi, Ditt. Mess. App. 7, 4 (Schiner).—Brazil, Colombia, Mexico, Guatemala, Nicaragua, Panama.

rostellata Loew, Berl. Ent. Zeit. ii, 109, pl. 1, f. 11, 1858. Schiner, Dipt. Novara, 21. Osten Sacken, Dipt. Biol. C. A. i, 2.

Plecia rostrata Bellardi, Ditt. Mess. i, 15, 3, 1859 (Schiner).—Colombia, Mexico, Nicaragua.

ruficollis Fabr. Spec. Ins. ii, 410, 53 (*Tipula*); id. Ent. Syst. iv, 249, 76 (*Tipula*); id. Syst. Antl. 53, 9 (*Hirtea*). Wied. Dipt. Exot. i, 31; id. Auss. zw. Ins. i, 73. Rondani, Oss. Esap. Ditt. 193. Macq. Dipt. Atlas, pl. iv, f. 17. Bellardi, Ditt. Mess. i, 15, 2. Schiner, Dipt. Novara, 21. Osten Sacken, Biol. C. A. Dipt. i, 3. Wulp. Tijdschr. Ent. xxiv, 143.

Plecia confusa * Loew, loc. ? vide Loew, Berl. Ent. Zeit. ii, 1858, 109.—South America, Brazil, Mexico, Guadeloupe.

similis Rond. Oss. Esap. Ditt. 193.—Insulæ St. Sebastiani.

velutina Macq. Dipt. Exot. Suppl. i, 149, pl. ii, f. 9, F. Lynch A. Cat. 119 (11).

"*Plecia funebris* (Fabr.," F. Lynch A. Nat. Arg. i, 185. F. Lynch A. Nat. Arg. i, 298 (F. Lynch A.).- Minas Geraes in Brazil, Buenos Aires.

vittata Wied. Auss. zw. Ins. i, 75. F. Lynch A. Cat. 119 (11).—Brazil, Buenos Aires.

HESPERINUS.

Walker, List, i, 81, 1848.

Spodius Loew, Berl. Ent. Zeit. ii, 101, pl. i, f. 1-15, 1858 (Osten Sacken).

conjugens Schiner, Dipt. Novara, 23.—Brazil.

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* With reference to *P. rostellata* Loew (B. E. Z. ii, 107), states "der brasilianischee *P. confusa* m. (*P. ruficollis* Fabr.) ahnlich." This is the only reference to *P. confusa* that I have been able to find

PENTHERA.

Philippi, Chil. Dipt. 639, 1865.

nigra Phil. chil. Dipt. 640, pl. xxiv, f. 18.—Chile.

PENTHETRIA.

Meigen, Syst. Beschr. i, 237, 1851.

nigrita Perty, Del. Anim. Art. Bras. 180, pl. xxxvi, f. 1.—Brazil.

LOBOGASTER.

Philippi, Chil. Dipt. 632, 1865.

paradoxus Phil. chil. Dipt. 632, pl. xxiv, f. 6.—Chile.
philippi Schiner, Dipt. Novara, 23.—Chile.

Species Described by Walker.

Plecia flavimaculata Walk. List, i, 116.—Venezuela.
Plecia maura Walk. Trans. Linn. Soc. Lond, xvii, 336.—Brazil.

Family SIMULIIDÆ.

SIMULIUM.

Latreille, Hist. Nat. Crust. et Ins. iii, 1802.

annulatum Phil. chil. Dipt. 634.—Chile.
antarcticum Bigot, Dipt. Miss. Cap Horn, 15.—Cape Horn.
anthracinum Bigot, Dipt. Miss. Cap Horn, 15.—Cape Horn.
chilense Phil. chil. Dipt. 634. Bigot, Dipt. Miss. Cap Horn, 15.—Valdivia.
chilianhum Phil. Rond. Dipt. Exot. 90.—Chile.
fulvescens Blanch. Gay. Hist. Chil. Zool. vii, 353. Phil. chil. Dipt. 633. Bigot, Dipt. Miss. Cap Horn, 15.—Chile.
montanum Phil. chil. Dipt. 633.—Chile.
nigrimana Macq. Dipt. Exot. i, 1, 88.—Brazil.
pulchrum Phil. chil. Dipt. 633. Tarsale Will. Dipt. St. Vincent, 268, pl. viii, f. 25, 25*a*.—St. Vincent.
tarsatum Macq. Dipt. Exot. Suppl. i, 148.—New Granada.
tarsatum Phil. chil. Dipt. 634.—Chile.
varipes Phil. chil. Dipt. 634.—Chile.
sic Roeder, Dipt. Stuebel, 4.—Peru.

Family BLEPHAROCERIDÆ.

See Osten Sacken, Berl. Ent. Zeit. xl, 1895, pp. 148–169, 351–355.

PALTOSTOMA.

Schiner, Verh. Zool. Bot. Ges. 1866, p. 931.

Schineri Will. Dipt. St. Vincent, 269, pl. viii, f. 27, 27a, 27*b*.—St. Vincent.
superbiens Schiner, Dipt. Novara, 28. Osten Sacken, Dipt. Biol. C. A. i, 5.—South America, Mexico.

SACKENIELLA.

Williston, Dipt. St. Vincent, 270, n. n. pro *Snowia*. Williston, Kans. Univ. Quart. i, 119, 1893, preoc. contra Mik, Wien. Ent. Zeit. 1897, 38.

rufescens Will. Kans. Univ. Quart. 1893, i, 120.—Rio Janeira.

CURUPIRA.

Fritz Mueller, Archivios Do Museo Nac. Rio Janeiro, iv, 1881.

torrentium * F. Mueller, l. c. 47.—Prov. St. Caterina.

NOTE.—For the much involved discussion resulting from the publication of this species the following works are the most important:

Osten Sacken, Ent. Month. Mag. Lond. xvii, p. 130, 206, 225.
Osten Sacken, Berl. Ent. Zeit. 1895, pp. 165-169.
Williston, Kansas Univ. Quart. vi, 1897, p. 12.
Mik, Wien. Ent. Zeit. 1897, 38.
Kellog, Ent. News, x, 1900, 306-318.

Family RHYPHIDÆ.

RHYPHUS.

Latreille, Hist. Nat. Crust. Ins. xiv, 291, 1804.

dolorosus Will. Dipt. St. Vincent, 298, pl. x, f. 74.—St. Vincent.

fasciatus Roeder, Dipt. Stuebel, 6.—Colombia (3200 Meter).

fuscipennis Macq. Dipt. Exot. i, 1, 84, pl. xi, f. 2. Blanch. Gay. Hist. Chil. Zool. vii, p. 352. Phil. chil. Dipt. 633. Bigot, Dipt. Miss. Cap Horn, 11.—Valdivia.

guttatus Schiner, Dipt. Novara, 48.—Brazil.

Revision of the American Species of the Genus CŒNONYMPHA.*

BY HENRY SKINNER, M. D.

These little butterflies have presented difficulties in determining them, which induced me to take an interest in the genus. They are very variable as to the number of spots and ocelli, and vary greatly in the color of the under side. The color of the upper side is fairly constant in the species respectively. I have been making an effort to get specimens for quite a number of years and I have kept all I received; therefore, I have long series representing distribution and seasonal variation. The species in all cases appear to have been described from very few specimens, and the describers could have had no idea of the kind or character of the variation, or its value for erecting new species. *Kodiak* was described from one male; var. *pulla* from one male; *pamphiloides* from one female; *ampelos* one pair; *brenda* two males, one female; *elko* two males, one female. It was only by accident that I found out what *elko* was. I happened to see that I had some of the original specimens from J. E. Bates in my own collection, otherwise I would probably still be in the dark. After a careful study of all the species, I have arrived at the conclusion that of any single character the color of the upper side is the most reliable. It is no infrequent thing to find the ocelli and spots differing on the two sides of the same insect. The original descriptions are given in all cases, so that students of the subject can compare the specimens and the views of the authors with my own conclusions.

C. californica Doub.-Hew., Gen. Diur. Lep., pl. 67, f. 2.

"Shape and size of our *davus*: resembles it in the appearance of the under side, but it is very different on the upper side, which is white, as in *phyrne* ♀: it flies in cool shady places."

The figure represents the upper side and is probably a female. The primaries have a single well-marked ocellus, and a narrow white band extending across the wing from the costa to the inner margin. The secondaries have two ocelli on each wing and a

* The remarks in quotations following descriptions are parts of the original articles.

wedge-shaped white line running from the costa for about a quarter of an inch, then bending at an angle and runs for an eighth of an inch toward the inner margin.

Mr. W. H. Edwards in his Butterflies of North America, Vol. iii, figures *californica*, var. *galactinus* and var. *eyrugii*, and also gives figures of the early stages and describes them. He gives *galactinus* as the Winter form, and *californica* as the Summer form.

Dr. W. J. Holland in his Butterfly Book, pl. 25, figures the upper sides of *galactinus*, *californica* and *eyrugii*, but as the characters of these slight varieties are the on under side the figures are of little value.

This is an exceedingly variable species. It varies in its seasonal broods, and also according to distribution, and doubtless according to altitude on mountains. I have studied a number of specimens from Los Angeles, Cal.; one series having been taken March 18th, and the other June 30th. The characters of the mid-Summer brood, as compared with the early Spring brood are as follows: they (the Summer forms) will average smaller; they are of a more yellowish tinge; they lack the black scales at base of wings; the edges of the wings above have a rusty appearance; the color of the line on under-side primaries is ferruginous, and the whole color of the wings is more of a ferruginous character. The color of the under side varies to a dark smoky grey. The ocelli or spot record of the species is as follows, each pair of numbers representing the under side of primaries and secondaries of a single specimen:

			Primaries.	Secondaries.
2	specimens	have	0	0
5	"	"	0	1
2	"	"	0	2
2	"	"	0	3
2	"	"	1	0
1	"	"	1	1
8	"	"	1	2
8	"	"	1	3
3	"	"	1	4
1	"	"	2	1
1	"	"	2	2
1	"	"	2	3
1	"	"	2	4
2	"	"	2	5

The only conclusion arrived at by a study of these spots is that they are of no value for the differentiation of varieties. I do not see any reason for retaining the names *ceres, eryngii* or *pulla*. *Pulla* was described from a single male, and *ceres* and *eyrngii* are synonyms of *galactinus*. If varieties are described on such slight grounds all our species in this genus, as well as all others, will be burdened by a multiplicity of varietal names. They appear logical when one has a single specimen from a single locality; but from the standpoint of the species as a whole they seem equally absurd.

I have fresh specimens from Cazadero, Cal., March 29th, and April 16th; Los Angeles, Cal., March 13th to 18th, and June 30th. I have two specimens of a *Cœnonympha* from Ashland, Or. (April 24th), which are intermediate in character between *californica* and *ampelos*.

The species has been taken in Cala., Mont., Nev., Oreg., Wash. and Vancouver.

C. californica var. **galactinus** Boisd., Ann. Soc. Ent. F. 2 me Ser. x, 309, 1852.

"Wings whitish on both sides, on the upper unspotted; the anteriors beneath with a ferruginous stripe and a minute apical ocellus; posteriors beneath sprinkled with cinereous on the base, with an obscure angulate stripe, and with two or three minute ocelli. It greatly resembles the preceding (*californica*), except that it is more yellowish white. It inhabits shady spots on mountains. Notwithstanding the contrary opinion of Mr. Lorquin, it may only be a local variety of *californica*, and we should not be surprised if both were only American forms of our *davus*."

This I take to be the Summer form and *californica* the Winter form, and therefore do not agree with Mr. Edward's conclusion as stated in his Butterflies of North America, Vol. iii.

C. ceres Butler. Ent. Mo. Mag., 3, 78, 1866.

"Wings above pale ochre; body pale. Front wings underneath reddish, base pale; anterior margin and the base smoky; a transverse reddish ochre band placed beyond the cell; a broad, indistinct, somewhat smoky subapical band; hind wings pale smoky, becoming more obscure at the base; a pale, ochreous, rather irregular, median band; two submarginal black points surrounded by pale ochre placed between the median nervules; body smoky-ochre. Wing expanse 1½ inches."

"*Hab.*—California. This species is closely allied to *C. californica* (Westwood); but as far as I can judge from the small number of specimens of allied species in the National Collection, it is quite distinct from that insect."

This is the Summer form of which I have numerous specimens from Los Angeles, Cal.

C. californica var. *eryngii* Hy. Edw., Proc. Cala. Acad. Sci., 7, 172, 1876.

"The upper side is exactly that of *C. californica* var. *galactinus*, wanting the black or dusky hairs at the base of the wings, the thorax and abdomen being concolorous. The under side is characterized by the usual straight band on the primaries, and the waved or dentate line of the secondaries, but there is an utter absence of points, spots or ocelli, in this respect closely approaching the ornamentation of *C. inornata*. I took this insect only in one locality, flying about the beautiful *Eryngium petolatum* Hook., which here attains a large size, and a most beautiful color. Size of *C. californica*."

"Soda Springs, Siskiyou Co., Cal. August; 11 ♂, 9 ♀; collection Hy. Edwards."

This is evidently a synonym of *ceres* Butler. The unspotted character of Mr. Hy. Edwards' specimens can have no weight. Mr. W. H. Edwards' figures *eryngii* with spots. Mr. Butler says *ceres* has two black points. An examination of my table of spots will show the futility of depending on them.

C. californica var. *pulla* Hy. Edw., Papilio, 1, 51, 1881.

"Entirely of a dark fawn color, with a leaden tint on the upper surface, and a blackish cloud at the base of the primaries, as in the var. *galactinus*. The markings of the under side are invisible, when viewed from above. Beneath dull brown, with a reddish tint on the discal region of the primaries, the markings very indistinct, being lost in the prevailing dark color."

"1 ♂, San Mateo Co., Cal. Type, coll. Hy. Edwards."

I have several specimens which answer this description. I see no valid reason for retaining the name.

C. kodiak Edw., Trans. Am. Ent. Soc., 2, 375, 1868.

"Male:—Expands 1.5 inch. Upper side light brown with a grey shade, the whole surface having a silky gloss, and appearing either brown or grey, according to the point of view; a common whitish bar, caused by the transparency of the wings. Beneath, from base to beyond middle of wings, brown, with grey scales on primaries and blue-grey on secondaries: this space edged by a common band of pure white: thence to margin pale brown, with a whitish or bluish grey tint as viewed. Body above brown; beneath, thorax covered with blue-grey hairs; palpi blue-grey; antennæ annulated brown and white."

"From Kodiak, Alaska. 1 ♂ from coll. of Hy. Edwards, Esq."

This species is close to *californica*. The color above is sufficient to distinguish it from *californica*. Below it hardly differs from some specimens of *californica*. My specimens were taken at Kodiak, July 2nd. Dr. Holland figures the type of *kodiak* in his Butterfly Book,

and says it is a female, whereas the original description by Mr. Edwards says "♂."

C. tiphon var. *mixturata* Alpheraky; Romanoff, Mem. sur les Lep., 9, 326, 1877. Kamtschatka.

This I take to be a synonyn of *kodiak*.

C. kodiak var. **yukonensis** Holland, Ent. News, 11, 386, 1900.

"♂.—The primaries on the upper side are bright ochraceous, with the outer margins and the costa shading into grey. A whitish subapical band, very poorly defined, extends beyond the cell from below the subcostals to the second median nervule, as in *C. kodiak* Edw. and *C. ampelos* Edw. The secondaries on the upper side are dark grey, very slightly tinged with ochraceous, traversed by an obscure whitish irregular median band, interrupted between the first and second median nervules. On the under side the primaries are dark ochraceous (in one example deep chestnut-brown), fading at the apex and on the outer margins into pale cinereous. The white band indistinctly seen on the upper side is reproduced on this side, sharply defined and solidly white. A small dark-pupiled ocellus is located near the outer margin, between the upper and lower radials. The secondaries on the lower side are dark fuliginous, passing into pale cinereous on the outer margin, with the median band of white clearly and sharply defined. A submarginal series of ocelli is faintly indicated. The female is like the male, but larger, and throughout paler in color on both sides of the wings. Expanse ♂ 30 mm.; ♀ 32 mm."

"This form in the arrangement of the markings comes nearest *C. kodiak*, with the type of which I have carefully compared it; but in color is nearer *C. inornata*. It may be a distinct species. Two ♂ ♂, Dawson, Yukon Terr., July 1st; 1 ♂, Eagle City, Alaska, July 14th; 2 ♂ ♂, American Creek, Alaska, July 18th."

I saw the specimens of this variety before Dr. Holland described them, and I consider them only color varieties of *kodiak*.

Hab.—Alaska.

C. ampelos Edw., Trans. Am. Ent. Soc., 3, 213, 1870.

"Male:—Expands 1.3 inch. Upper side bright, glossy ochraceous; immaculate; fringes concolored. Under side nearly same shade, paler and changing to buff at apex of primaries; on secondaries slightly paler at outer angle, and elsewhere much powdered with brown atoms; a pale straight ray from costal edge of primaries nearly crosses the wing; secondaries have a similar ray, tortuous, interrupted in the upper median interspaces, not quite reaching abdominal margin; both wings immaculate. Body fuscous, covered with ochraceous hairs; beneath yellowish and grey; palpi grey; antennæ annulated black and white, club black, tip ferruginous."

Female:—Same size, slightly paler; otherwise like male.

"From 1 ♂, 1 ♀. Oregon. Allied to *inornata* Edw."

Mr. Edwards and Dr. Fletcher state that they never saw this species with an ocellus. I have examined my specimens and have

found two specimens with spots on the secondaries. The series of specimens is as follows:

	Primaries.	Secondaries.
1 specimen	0	1
1 "	0	2
30 "	0	0

The species varies in color above to a slight degree, some specimens showing a different shade of light buff. There in considerable difference on the under side. Some specimens almost fuscous; some are immaculate on the under side of both wings. The species flies in Vanc., Wash., Oreg., Nev., Mont., Utah, Idaho.

I have fresh specimens taken in May, June and September.

C. elko Edw., Can. Ent. 13. 57, 1881.

"Male:—Expands .95 to 1 inch. Upper side pale ochre-yellow, immaculate; fringes concolored. Upper side of primaries nearly same ochre-yellow over basal area and part of disk, limited without by a slightly sinuous and crenated edge of deeper color, much as in the allied species; outside this, slightly ochraceous next inner angle, but yellow-buff over apical area. Secondaries have the basal area uniform grey-brown, the outline distinct and in strong contrast with the remainder of the wing, which is yellow-buff. Very slightly grey; the outline is irregularly crenated, with a deep sinus on upper subcostal interspace, and another on lower disco-cellular interspace.

"Female:—Expands 1 inch to 1.02. Upper side like the male. Beneath, the area just outside the the crenated edging on disk of primaries is yellow for a little distance, then tinted ochraceous to margin, in one example a minute black dot in the disco-cellular interspace with white centre, in another no dot; secondaries as in the male, basal area one shade of grey, with distinct crenated outline, and beyond a yellow or buff-ground to margin, very little dusted grey."

"From two ♂ ♂ and two ♀ ♀ taken at Elko, Nevada, 1881, and sent to me by Mr. J. Elwyn Bates, of South Abington, Mass. Mr. Bates informed me that he had quite a number of examples. The present species is nearly the same color with *C. ampelos* Edw., from Oregon; on upper side a little more yellow, and with less gloss. The under side is much lighter, and on secondaries the contrast between the dark basal area, with its clear cut outline and the pale yellow extra discal area, is great. *Ampelos* has the under side of same general character as *inornata* Edw. (only different in coloring), from Montana and Winnipeg. *Elko* resembles *californica* Bois., rather, in which species, many examples have the basal area dark and the entire outline of same distinctly defined."

These spots are not exactly ocelli, but pin-point black dots surrounded by a yellow ring.

	Primaries.	Secondaries.
10 specimens	0	0
13 "	1	0
3 "	1	1

Specimens taken Sept. 9th, at Salt Lake City, expand 1⅝ inch, especially the females. Many specimens are immaculate below. They vary in color and in the definition or distinctness on the two sides of the crenated line below. The dates are May 23rd, July 15th, September 9th. I have specimens of *elko* taken with the types at Elko, Nevada, and received from Mr. J. E. Bates. After careful study of a large amount of material, I see no reason to consider this different from *ampelos*.

C. ochracea Edw. Proc. Acad. Nat. Sci. Phil., p. 163, 1861.

"Male:—Upper side entirely of a bright glossy ochre-yellow, without any spot or mark, except what is caused by the transparency of the wings; base of both wings dark grey; abdominal margin of secondaries pale grey; fringe pale grey, crossed by a darker line. Under side: Primaries same color as above; costal margin, apex and base greyish; near the apex a round, sometimes rounded-oblong, black spot with white pupil and pale yellow iris; this is preceded by an abbreviated, pale yellow, transverse ray. Secondaries light reddish brown, greyish along the hind margin; abdominal margin and base dark grey; near the hind margin and parallel to it is a series of six black dots, sometimes obsolete, usually with white pupil and broad yellow iris; near the base two irregular pale brown spots, and midway between the base and the hind margin a sinuous, interrupted ray of same color, extending nearly across the wing. Female like the male."

"Lake Winnipeg, California, Kansas."

This is quite a variable species. The upper side differs very much in different specimens in regard to the distinctness with which the spots below show through on the upper side. The ocelli or spot record is as follows—under side:

	Primaries.	Secondaries.
5 specimens	1	0
4 "	1	1
2 "	1	2
4 "	1	3
4 "	1	4
11 "	1	5
15 "	1	6

The color of this species, in conjunction with the distinct ocellus on the primaries below, serve to distinguish it from all others.

It is found in British America, Kansas, Colorado, Utah, Montana, Nevada, California. Fresh specimens bear dates as follows: April 30th, June 15th, July 5th, August 4th.

C. brenda Edw., Trans. Am. Ent. Soc., 2, 375, 1868.

"Male:—Expands 1.4 inch. Upper side light buff, immaculate. Under side a shade more yellow; primaries have a faint, transverse, reddish line beyond the cell, commencing at subcostal, thence straight to upper median, after which it is tortuous and disappears near lower median. Secondaries have a similar line angular to end of cell thence tortuous to abdominal margin; primaries have a large subapical round black spot and a point in lower median interspace; secondaries have a submarginal row more or less complete of small spots or points. Body and legs light buff; antennæ buff, club pale ferruginous.

"Female:—Expands 1.5 inch. Upper side like male; beneath, the apex of primaries and space within the discal lines much obscured by grey; subapical spot large, enclosing a white point; spots on secondaries partly wanting."

Var. *a*, Male.—The under side showing no trace of spots except the subapical, which is faint.

"From Los Angeles, Cala., 2 ♂ ♂, 1 ♀. Collection of Tryon Reakirt, Esq."

This is only a much spotted *ochracea*. If we give names to all the variations of *ochracea* we would have six names for the species. I would call attention to the unvarying character of the primaries below with the one ocellus.

Tiphon var. **laidion** Borkh. Eur. Schmett., 1, 91, 29, t. 1, f. 5, 6, 1788.

Dr. Buckell, exhibiting as a visitor, showed specimens of *Cœnonympha inornata*, on which he read the following notes:

"In the paper on *Cœnonympha tiphon*, which I read here in October, 1895 (Ent. Rec., vol. 7, pp. 100–107), I alluded to the American butterfly, described by W. H. Edwards, under the name *C. inornata*, which he and Scudder considered to be a distinct species, but which the late Jenner Weir looked upon only as a variety of *C. tiphon*. My paper was read by Mr James Fletcher, of Ottawa, the entomologist to the Dominion of Canada, and he very kindly sent me the five specimens of what, as he writes 'we here call *C. inornata*,' which had been taken in the Northwest during the Summer of 1895, and which I exhibit this evening. In the right-hand column I have placed some specimens of the Scotch form of *C. tiphon* var. *laidion*, and may just remind you that the characteristic mark of this form is the obsolescent condition of the ocellated spots on the under side of the hind wing. Comparing the two insects, the American specimens have a brighter coloration on the upper surface, and the hind wings are very little, if at all, darker

than the fore wings, whilst in the Scotch specimens they are distinctly darker. On the under surface of the fore wings it is noticeable that the apical ocellated spot is much more developed in the American than in the Scotch specimens. The marked feature of the under surface of the hind wings is the entire absence of ocellated spots in the four upper specimens; on the lowest there is just a trace of one. In four of the Scotch specimens there is likewise an entire abscence of ocellated spots. On the whole, I am disposed to adhere to the opinion that I expressed provisionally in 1895 that *C. inornata* is not sufficiently different from *C. tiphon* var. *laidion* to be worthy of a varietal name." (Ent. Rec., 9, 99, 1897).

C. inornata Edw. Proc. Acad. Nat. Sci. Phil., p, 163, 1861.

"Male:—Expands 1.4 inch. Upper side ochrey-brown, lighter in the disk of all the wings; costal margin of primaries and abdominal margin of secondaries greyish, no spots above or below; fringe grey, crossed by darker line. Under side: Primaries same color as above from the base to beyond the middle, then a transverse sinuous ray of paler color, and beyond this to hind margin greyish; sometimes this ray disappears, the basal color extending nearly to the apex; secondaries grey, with a slight greenish tinge, darker from base to middle, and this shade separated from the paler margin by a transverse, tortuous, interrupted ray, the course of which is parallel to the hind margin.

"Female:—Wholly dull ochrey yellow, marked as in the male."

"Lake Winnipeg. From Mr. Robert Kennicott."

This species is readily distinguished by its rich dark color, being the darkest of all the species except *haydenii*. Like all the other species it has ocelli. Mr. Edwards' specimens were evidently devoid of ocelli, as he says "no spots above or below."

The ocelli record is as follows:

		Primaries.	Secondaries.
Upper side:	4 specimens	1	0
	8 "	0	0
Under side:	2 "	0	0
	11 "	1	0

Of these eleven specimens one has five faint points on inferiors below and one has one faint point. Two specimens are without locality labels; two are from Qu'appele, Assa., Canada; and the remainder are from Minneapolis, Minn., taken June 18th to July 4th. The species flies in Montana, Minn., Brit. America, Newfoundland and Europe.

I see no reason to doubt Dr. Buckell's conclusion in regard to *inornata* and *laidion*. I have European specimens which I have compared with *inornata* and find them the same.

C. pamphilus Linn., Syst. Nat., Ed. x, 472, 1758.
C. pamphiloides Reakirt, Proc. Ent. Soc. Phil., 6, 146, 1866.

"In a note below I have appended a description of the species of *Cœnonympha*, referred to by Dr. Behr in his Notes on Californian Satyrides, and concerning which, he remarks: 'There exists a second *Cœnonympha* in some sequested valleys of the Northern Sierra that approaches in coloration the European *C. pamphilus*. I have only seen one pair of this species, and not possessing it, I cannot give a diagnosis. It may be identical with *C. inornata* Edw., or *C. ochracea* Edw., or some northern species.'"

"Upper surface very similar to *pamphilus*; the ciliæ, however, are considerably longer. Under surface of the primaries as in *pamphilus*; secondaries mottled greenish brown from the base to the middle, abruptly terminated by a very irregular margin, adjoining which, on upper half, from the costa, a yellowish grey patch; hinder half of wings of same color as the basal portion, but very much diluted in tone; a submarginal row of six white spots, each encircled by a brownish green ring, all minute but still very distinct. Expanse 1.13–1.18 inch.

"*Hab.*—California (coll. Tryon Reakirt)."

The unique type of this is a female in the collection of Dr. Strecker. Dr. Strecker in his Synonymical Catalogue, published in 1878, says: "I possess Reakirt's original type from California, which differs in nowise from the ordinary European form." I have in my collection two specimens without locality labels; two with Cala. on the pins. I know nothing of these specimens, as I have never received *pamphilus* from California. It is quite possible that Reakirt made a mistake in thinking his specimen came from California, as such mistakes were common in those days, and little attention was paid to data. Time will settle this question, as if *pamphilus* is really found in California, we can take it for granted that Reakirt did not make a mistake, except as to the name of the species.

Pamphilus is close to *ochracea* Edw. but smaller; the inner half of under side of secondaries is darker (olive green), and the spots the merest white or silvery pin points.

What Dr. W. J. Holland figures in his Butterfly Book as *pamphiloides* is the spotted form of *ochracea*, which Mr. Edwards called *brenda*. The types of the latter are in Dr. Strecker's collection.

C. haydenii Edw., U. S. Geog. Surv. of Montana, etc. F. V. Hayden, for 1871 (1872).

"Male:—Expanse 1.6 inch. Upper side fuscous, immaculate; under side a shade paler, much irrorated with gray scales; primaries immaculate; secondaries have a complete series of black ocelli along the edge of hind margin, one in

REVISION OF THE GENUS CŒNONYMPHA (SKINNER).

each interspace; each ocellus narrowly ringed with ochraceous, and having minute white pupil."

The female was described from a male by Mr. Edwards, Can. Ent., 33, 32, 1891. The female was described by myself, Can. Ent., 29, 156, 1897, from specimens taken in the Yellowstone Park by Prof. A. J. Snyder. It is like the male in markings, but in color quite different as it is light yellowish brown. Fresh specimens bear date Hayden Valley, Yellowstone Park, August 1st, and Beaver Canon, Idado, July 23rd. The species has been found in Montana, Idaho, Colorado and Wyoming.

LIST OF THE SPECIES.

1. Californica *Boisd.*
   - var. galactinus *Boisd.*
     - *ceres* Butl.
     - *eryngii* Hy. Edw.
   - aberr. pulla *Hy. Edw.* *
2. Kodiak *Edw.*
   - var. yukonensis *Holl.*
3. Ampelos *Edw.*
   - *elko* Edw.
4. Ochracea *Edw.*
   - *brenda* Edw.
5. Typhon var. laidion *Borkh.*
   - *inornata* Edw.
6. Pamphilus *Linn.*
   - *pamphiloides* Reak.
7. Haydenii *Edw.*

DESCRIPTION OF PLATE.

No. 1.	*C. kodiak*, ♂, Kodiak, Alaska, July 2nd.—	Upperside.	
" 2.	" " " " " "	*Underside.*	
" 3.	*C. californica* ♂, Los Angeles, Cala., March 8th.—	Upperside.	
" 4.	" " Kaweah, Cala., Early Spring.	*Underside.*	
" 5.	*C. galactinus*, ♂, Los Angeles, June 30th.	Upperside.	
" 6.	" " California, Summer.	*Underside.*	
" 7.	*C. ampelos*, ♂, Oregon.	Upperside.	
" 8.	" " Umatilla, Or.†	*Underside.*	
" 9.	" " Salt Lake City, Utah, Sept. 9th.	*Underside.*	
" 10.	*C. laidion*, ♀, Minneapolis, Minn., June 17th.	Upperside.	
" 11.	" " " " " "	*Underside.*	
" 12.	*C. ochracea*, ♂, Park City, Utah, July 1st.	Upperside.	
" 13.	" " Bear Creek, Colo., July 3rd.	*Underside.*	
" 14.	" " Park City, Utah, July 8th.	*Underside.*	
" 15.	*C. pamphilus*, ♂, California. ?	Upperside.	
" 16.	" ♀, California. ?	*Underside.*	
" 17.	*C. haydenii*, ♂, Beaver Canon, Idaho, July 23d.	Both sides.	
" 18.	" ♀, " " " " "	Upperside.	

* Since this paper was written I have seen the unique type of *pulla* in the collection of the American Museum of Natural History. It is a dark slate or smoke color, and may be considered an aberration of *californica* until sufficient material fixes it definitely.

† Very dark immaculate form.

New Species of North American CYNIPIDÆ.

BY H. F. BASSETT.

Ten years ago I published an article in the TRANSACTIONS describing forty-one new species of gall flies. In that article I stated that I had still a considerable number of undescribed species. Since then some new species have been found, and some specimens have been reared from galls I have long known, and it happens that my paper contains descriptions of forty-one species, but the number was not intentionally the same.

I still have some material in hand, but it is doubtful whether my studies of the Cynipidæ will ever be carried any further.

I trust the infirmity of failing eyesight has not prevented a fairly good execution of a task at all times difficult; but I gladly leave to younger men a work that has for forty years had most of my leisure, and has always been an unfailing source of purest happiness.

Antistrophus leavenworthi n. sp.

The galls of this species are immense enlargements of the stalks of some plant of the order Compositæ, probably of the genus *Lactuca* or *Mulgedium*.

My friend, Mr. F. Leavenworth, of Petersburg, Va., from whom I received the specimens, informs me that larger galls occur than those sent, though the largest of these measures between four and five inches in diameter. They are unevenly globular. The flies live over Winter in the galls.

Gall-fly.—*Male.*—Body black. Antennæ fourteen jointed, first black; second dark brown, globose; third of moderate length, club shaped, the following joints dusky reddish brown, all nearly equal in length. Head minutely punctate. Collare very broad and with the mesothorax rather coarsely punctate. Parapsidal grooves and a strong median line continuous from the collare to the scutellum. Scutellum large and rugose. Foveæ large, deep and smooth. Abdomen smooth, shining; first segment (second ?) two-thirds of the entire length. Legs very dark reddish brown. Wings hyaline. Veins pale, slender and absolutely colorless throughout. Radial area open, broad. Areolet wanting. Body .12, antennæ .10, wings .11.

Female.—Antennæ thirteen jointed, thirteenth very long. Body in bulk considerably larger than the male. Legs less dark. Female .14, antennæ .10, wings, .12.

Three males and eighteen females in my collection.

Mr. W. H. Ashmead kindly determined the generic place of this species. Named for Mr. Leavenworth, to whom I am indebted for the species.

Andricus (Callarhytis) tuberosa n. sp.

Galls.—Woody, polythalamous, growing on *Q. ilicifolia* and reaching maturity in June. They are the young shoots of this oak, checked in their terminal growth, by the sting of the insect. They resemble the galls of *A. scitulus* B., but more closely those of *A. tectus* B. The largest are not more than $\frac{5}{8}$ of an inch in length and $\frac{1}{4}$ in diameter. They are quite rare.

Gall-fly. *Male.*—Black. Antennæ fifteen jointed, first and second joints thick, ovate, first dark brown at the base, lighter above; second and the six or seven following yellowish brown, remaining joints dusky, the third joint is curved but not incised. Head punctate. Thorax obscurely wrinkled as seen under a strong magnifier. Pleuræ beautifully striate. Parapsides fine and very distinct. Scutellum finely rugose; fovæ small. Abdomen small, briefly petiolate. Legs brownish yellow. Wings hyaline, and with a microscopic pubescence. Veins pale, areolet distinct; cubitus slender, and reaching to the first transverse vein. Radial area open, broad. Body, .06; antennæ, .06; wings, .09.

Female.—Antennæ thirteen jointed, first and second globular, all pale brown, towards the apex becoming somewhat dusky brown, all the joints are very short. Head, thorax and scutellum as in the male. Legs paler brown and more uniform in color than those of the male. Abdomen briefly petiolate; second segment large. Wings as in the male but shorter. Body .07, antennæ .05, wings .08.

Waterbury, Conn. Not abundant.

Andricus pruinosus n. sp.

Galls.—.12 to .15 of an inch in diameter, perfectly round and variously situated on the leaves, and occasionally on the sterile aments of *Q. obtusiloba*. Outside they are densely pruinose, and the walls are very thin. There is no larval cell. In many instances the blade of the leaf, or the part affected by the gall, is reduced to a mere rudiment of irregular form and varying size, but in such cases the gall is always banded by a minute ridge answering to the leaf blade. It bears a rather close resemblance to *A. utricula* B.

Gall-fly. *Female.*—Shining black. Antennæ thirteen jointed, first and second very minute and light brown, all the following gradually shorter to the apex which is dusky brown. In a few specimens there is a faint suture in the thirteenth joint. Thorax narrow or subcompressed, finely punctate and with a few scattered hairs. The two median lines and the parapsides all even and distinct. Scutellum microscopically wrinkled; fovæ small, deep and shining. Abdomen large; second segment very long, almost tubiform and covering all the others in the dry specimens. Legs dark translucent brown but paler at the joints and tarsi. Wings subhyaline. Veins not heavy but distinct in the basal portion of

the wing but hardly traceable above. Radial area open and short. Areolet very small, the upper side bounded by a longer vein than the others which gives it a squat appearance, which is quite unique. The cubitus reaches half-way to the first transverse. Body .10, antennæ .09, wings 10.

Female.—Body .10; antennæ .08; wings .11.

Collected by myself on East Rock, New Haven, Conn., May 7 ?

Andricus parmula n. sp.

Galls.—Minute, flat, saucer shaped, with a slight elevation in the center. This central portion is the small larval cell. They are sessile on the under side of the leaves of a species of oak unknown to me. They are only .08 of an inch across the top, and are of a fine red color. They are, in habit, very much like a species found on *Q. alba*, but are very much smaller, and the white oak gall is a pale blue color. I am not sure that the white oak gall has yet been reared. There are several other species that somewhat resemble this one. I received these galls from Mrs. E. H. King, of Napa City, California.

Gall-fly.—A female cut out of a dry gall. The crumpled wings and compacted body make description rather difficult. Head dark brownish red. Antennæ thirteen jointed, first large, dark brown, second large, lighter color than the first, the following shorter and gradually darker to the last five which are dusky brown. Entire body bright red. Thorax finely punctate. Parapsides fine but distinct, and diverging far less than in other species. Abdomen finely polished. Legs red. Wings colorless, as are also the veins, except the second transverse and the subcostal. Radial area is scarcely discernible, but is open. Areolet wanting. Body .08; antennæ .07; wing .08.

Andricus patiens n. sp.

Fifty or more individuals captured in early Spring in the act of ovipositing in the buds of *Q. ilicifolia*. They were taken when the temperature was so low that a heavy overcoat was needed to keep one comfortable, and a stiff northeast wind prevailed, and the buds showed no signs of life.

These insects must be strangely insensible to cold, or be driven by an irresistible impulse to deposit their eggs, or they would not brave such inclement weather.

Gall-fly.—Head small, very dark red, hairy and rugose, vertex flattened. Antennæ fourteen jointed, first dark, heavy and club shaped, second stout and one-third the length of the first and of a lighter color; third equal to the first two; fourth, fifth and sixth gradually shorter, the following short and of equal length. All except the first are a dusky red, that under the magnifier becomes of a bright coppery hue. Thorax and scutellum dull red and covered with extremely fine, short hairs that really are little more than a coarse pubescence. Parapsides,

median lines and lines over the base of the wings all present but not very distinct. The median lines reach about one-third the distance from the collare to the scutellum. The head and entire thorax have, to the naked eye, a dull ashy red appearance. Scutellum small; foveæ widely separated, not smooth and shining. Abdomen black, very smooth; first segment with a few scattered hairs on its anterior half. Legs clear, semi-translucent red. Femur of the posterior pair large in the middle, almost ovate. Ungues long, dark and slender. Wings rather large, faintly fuscous; veins—the larger are very pale red, the smaller almost or quite colorless. Radial area open, and by a slight incurve in the radial vein the area is broadest in the middle. Areolet present, the anterior sides bounded by very fine colorless veins. Cubitus short. Body .12, antennæ .09, wings .15.

This species differs from *A. operatola* Riley and Bassett in having fourteen jointed antennæ, head and thorax darker red, smoother surface and a more dense hairiness or pubescence of the mesonotum. The finer thoracic lines, the unpolished foveæ and in the medium sized but distinct areolet, also in the smaller size. All my specimens are remarkably uniform in size and appearance.

Andricus perditor n. sp.

The acorns of *Q. ilicifolia* are, as is well known, two years in reaching maturity. In the Spring of the second year they are still very small, hardly as large as a coriander seed. At this time ants are often seen hurrying about among the young acorns and feeding upon a liquid that exudes from some of the acorns. The affected acorns are really galls—transformed acorns—that differ little in form and color from the unaffected acorns. The larva of a gall-fly lives in each of these pseud acorns. Its larval growth is complete in Spring or early Summer. I have never found them very abundant though they appear quite constantly from year to year. I have so far succeeded in rearing only a single gall-fly, and in this specimen, cut from the gall, the wings are not fully expanded.

This fly is a female and probably one of the agamous class whose bisexual form is not yet discovered.

Gall-fly.—Head, antennæ and legs deep brownish red. The head finely punctate. Mesothorax darker than the head and scutellum. Antennæ fourteen jointed, first long and ovate, second short, subquadrate, third and fourth nearly equal, fifth and the following short. Mesothorax transversely and unevenly rugulose, and with short, scattered and closely appressed hairs. Parapsides very slender and subobsolete anteriorly. The usual parallel, intermediate lines faint and ending half way to the scutellum. Lines at the base of the wings present but indistinct. Scutellum long and narrow, ending in a blunt, rounded point. It is rugose and hairy. Foveæ small and rather widely separated. Abdomen black and polished. The second segment is fully three-fifths of the entire length.

A few extremely minute hairs on the sides of this segment close to the anterior margin. Legs light brown at the joints. Wings large, veins dark brown, areolet wanting, radial area open. Gall .12 to .15 long (base to apex), .10 to .12 broad. Base broad, apex cone shaped. Base with the cicatrix of a true acorn.

Andricus pulchellus n. sp.

Gall-fly.—A female found ovipositing in the buds of *Quercus prinoides*. Black and glistening. Head small. Antennæ fourteen jointed, slender, dark reddish brown, first joint medium size, globose, second very small, the following short and of uniform length. Thorax ovate, punctate, sparsely hairy, hairs fine. Parapsides large, closely converging, both on the collare and the scutellum. Scutellum small; foveæ rather widely separated, small and shining. Abdomen short; first segment long, four-fifths of the entire length, black and smooth. Legs clear reddish brown. Wings large, veins pale brown, very slender. Radial area open. Areolet large and bounded by veins of uniform size. Cubitus indistinct and reaching half way to the first transverse. Body .10, antennæ .09, wings .14.

Andricus piperoides n. sp.

Galls from one-eighth to three-eighths of an inch in diameter, in dense clusters along the mid-vein of full grown red oak leaves (*Quercus rubra*). They are found only on the largest leaves of the thriftiest shoots of young oaks. The clusters contain from one or two dozen galls up to a hundred or more, and extend along the vein two, three or even four inches. The vein is considerably enlarged, and is often split by the crowding of the galls as they increase in size. The blade of the leaf is often torn by the same force and the galls appear on both surfaces. When on the tree they are covered with a dense, coarse pubescence which is, in color, a dusky drab, or when exposed to the sun a brownish red. They are round except a very slight elongation at the point of attachment to the leaf. After falling to the ground they soon turn black, and after losing their pubescence they resemble quite closely small black pepper corns. At this time they are a solid mass of vegetable cells with a minute jelly-like center, which is the undeveloped larva. The growing larva devours the gall till at maturity nothing remains but a thin shell.

My galls were collected in October and were kept until late the next Summer under conditions as nearly normal as possible. As the flies seemed mature in August I placed the galls in dry boxes, expecting the insects would soon appear.

During October and November I removed from the galls some two hundred insects. They were somewhat torpid but seemingly mature. These were alive in January of the next year, and those

in the galls had undergone no change. A few individuals emerged from the galls in the Winter, though most remained alive in the galls many months after.

Gall-flies all females. Entire insect dark reddish brown. Head microscopically punctate. Antennæ fourteen jointed, first of moderate length, second short, ovate, third one-third longer than the first two, fourth to the seventh gradually shorter, the following short and ovate. Thorax smooth, shining, mesothorax with broad, deep parapsidal grooves. Scutellum subquadrate, finely rugose; foveæ broad, distinct, the carina small, but extending to the posterior margin of the scutellum. Abdomen large, compressed laterally so as to give to the dorsal and ventral edges a knife-like sharpness. It is entirely smooth, except a few minute hairs on the sides of one of the terminal segments (the last but one). Legs less dark than the rest of the body. Wings large, veins distinct. Areolet obsolete or nearly so, reduced to a very small light spot at the crossing of the heavy veins. Cubitus extends almost to the first transverse. Radial area open, its broad basal vein stopping abruptly at a distance from the costal border. Body .14, antennæ .10, wings .16.

The extremely slow development of this species gave an opportunity to study the changes as they took place

Andricus operatola Riley and Bassett (Manuscript ?).

I cannot find that Prof. C. V. Riley ever published a full description of this gall and gall-fly, and this is, undoubtedly, the agamous form of *operator* O. S., to which he gave the manuscript name above given. He reared the gall-fly from galls which he and myself collected near my home in Waterbury, Conn., in the Autumn, and the next Spring he sent me specimens of the flies which he had reared, and he referred to the species in different writings, I think. But nothing, so far as I can learn, like a full description has ever been published. I have written a full account of the discovery of *A. operator* ovipositing in the acorns and of the development of the galls therefrom, which was published in the Proc. Ent. Soc. Phila., in 1864; but I give here only the characters necessary to its identification. The galls are produced from the eggs of *A. operator* O S., who deposits them at or near the base of the young acorns of *Q. ilicifolia*. The ovipositor is thrust down between the acorn and the acorn cup, and in due time the gall is developed. The galls reminds one of the pseud chestnuts that are often seen in the chestnut burrs, being flattened and rarely approaching the shape of an acorn. From one to five or six of these are found in an acorn and they vary greatly in size, from that of a flaxseed to one-third of an inch in length. The acorn is, in most cases,

aborted, and the galls that mature (many are destroyed by parasites) fall to the ground. The larvæ at this time are nearly or quite grown, and early in the Spring following, a part of them have become imagos. Another part remain in the larval state another year, while a few remain in this condition still longer, and, as suggested by Professor Riley, may develope the third year. I know one other of our agamous species that makes the continuance of the race sure by similar means.

Gall-fly.—Head, antennæ, thorax and legs dark red. Head very broad and curved back, almost crescent shaped, very finely rugose. Antennæ thirteen jointed, first dark, heavy, second very small, globose, and only one-third as long as the first, third not heavy, nor quite as long as the first two, fourth to twelfth gradually shorter, thirteenth long and tapering to a point. Thorax finely punctate. Parapsides very fine, as are also the two intermediate lines. These extend a little more than half way to the scutellum, and are posteriorly, very slightly divergent. Lines over the base of the wings distinct, though minute hairs somewhat obscure the lines and punctation of the thorax. Scutellum roundish, small, faintly rugose and more hairy than the thorax; fovæ oval, shining, oblique and separated by a broad carina. Abdomen black, polished, first segment very large, its sides sparsely covered anteriorly with small white hairs. Legs paler red than the thorax. Wings hyaline, veins not large, the subcostal and two transverse smoky brownish red, others nearly or quite colorless. Radial area long. Areolet obsolete, cubitus faint and short. Body .14, antennæ .12, wings 18.

Andricus obtusilobæ n. sp.

Gall-fly. *Female.*—Head, antennæ and legs a clear yellowish red. Antennæ thirteen jointed, first joint slender, club shaped, second one-half as long, and the third equal to the first, following gradually shorter to the thirteenth, which is twice as long as the twelfth. Head broader than the thorax. Eyes and ocelli black. Vertex evenly and finely wrinkled or punctate. Thorax—the two median and parallel lines are faint and extend half way to the scutellum. The parapsides present but indistinct. General surface of the mesonotum punctate. Scutellum finely rugose; fovæ small, shallow and smooth. Abdomen polished and, posteriorly, darker than the thorax. The tarsi of the posterior pair of legs are also darker than the others. Wings not quite hyaline, veins faint. Radial area open. Areolet wholly wanting, cubitus slender, but reaching two-thirds the distance to the first transverse vein. Body .10, antennæ .06, wings .08.

Galls unknown. The two individuals I have being found in the breeding box with my *A. pruinosus*. I do not recall a species that very closely resembles this in color. It is much paler and smaller than *A.* ? *operator* O. S.

Andricus Kingi n. sp.

Gall.—A broad, ovate, saucer-shaped base terminating in a small, slender cone with incurved sides. The point of the cone is open down to the flattened larval cell which lies close to the base of the

gall. The surface is closely pubescent and of a smoky gray color. They are about one-fourth of an inch long and one-fifth in diameter across the widest part of the base or rim of the saucer. The leaves to which they are attached are those of *Q. alba*, I think.

Gall-flies.—Two females bred from galls sent me by Mr. E. H. King, of Napa City, Cal. Head and thorax brownish red. Eyes and ocelli black. Antennæ dusky brownish red, fourteen jointed, or the thirteenth long and quite distinctly annulate, first and second equal in length, the first clavate, the following gradually shorter to the thirteenth. Thorax microscopally punctate and with a few minute hairs. Parapsides—small and indistinct. Scutellum heavy, coarsely punctate; fovæ subobsolete, or rather replaced by two dark, round, hairy, scarcely depressed spots. Abdomen red, approaching black, a very few, widely scattered hairs on the sides of the basal half of the first segment. Legs slender, brownish red. Wings large, hyaline, veins slender, pale brownish red. Radial area open, long and narrow. Areolet well defined by very small veins. Cubitus pale, reaching less than half way to the first transverse. Body .10, antennæ .08, wings .14.

Mrs. E. H. King has sent me several Cynipidæ, and I take pleasure in giving her name to this fine species.

Andricus incertus n. sp.

No galls. One gall-fly taken ovipositing April 22, 1890, in buds of *Q. bicolor*.

Head black, broad. Antennæ fourteen jointed, first shining black, clavate, second very large, ovate, third one-half longer than one and two together, fourth equal to one and two, the following gradually shorter, all dark brown. Thorax black, rough and hairy. Parapsides—two parallel lines reaching half way from the collare to the scutellum, two widely separated and diverging lines from the scutellum half way to the collare, a short line over the base of each wing, all these very obscure because of the hairiness of the mesonotum. Scutellum very small and rough; fovæ extremely minute and almost as lustreless as the scutellum. Abdomen black and shining. First segment two-thirds the entire length. Legs dark, shining brown, nearly black, but a trifle lighter at the joints. Wings hyaline, veins slender. Towards the base of the wings there is a smoky brown spot. Areolet medium size. Radial area open. Body 13, antennæ 07., wings 11.

Andricus ignotus n. sp.

A single female gall-fly of an unknown species appeared in a box of fresh galls of *A. pruinosus*, which, though not differing much in size, is certainly distinct from that species, or any other known to me.

Head black, vertex very finely punctate. Antennæ long, fourteen jointed, first large, broad at the apex, but with a remarkably small base, second ovate and placed like an egg in the deep cavity of the first, third nearly twice the length of the first two, fourth one-third, and the fifth one-half shorter than the third, the remaining joints nearly equal. Color one and two clear reddish brown, the

following from dark to dull brown, nearly black at the apex. Thorax black, space between the very deep parapsidal grooves elevated and shining, though minutely uneven or punctate between the parapsides, at the collare are two very black round spots. Scutellum small, finely uneven or rugose. Foveæ—if such they can be called—widely separated and hardly more than a less roughened and very shallow depression. Abdomen polished, black, first segment large and with a few extremely minute hairs on the sides of the anterior half of this segment. Legs clear, translucent brown. Wings large, faintly fuscous, hairy. Veins rather heavy. Areolet distinct. Cubitus disappearing close to the first transverse. Areolet open, angles at its base, one sharply acute, the other correspondingly obtuse. Body .09, wings .11, antennæ .07.

From East Rock, New Haven, Conn.

Andricus exiguus n. sp.

Visiting West Rock, near New Haven, Conn., several years ago in June, I found among the dry but still adherent aments of *Q. obtusiloba* a number of very minute, dark colored, oval galls. The insects had escaped, but the species was new to me. Three or four years later I visited the locality in May and found galls in abundance, and the flies were very near maturity. I collected plenty of galls by breaking off small flower-covered branches. Placing these in water and keeping them under glass, a large number of very small gall-flies soon appeared. The galls were thin, short, oval larval cells, merely the modified sterile florets of the oak. Of galls affecting the sterile flowers of different kinds of oaks there are several species, but these were smaller and otherwise different from any I had seen. The effect of the sting of the fly was often to check the extension of the floral stems to a degree that reduced the florets to a close bunch or mass. This glomerate condition did not prevent the development of the gall-flies, and probably ten times as many flies appeared as there were galls in sight These galls are hardly black, but rather of a very dark slate color; they are not quite smooth. In size they measure nearly .05 of an inch in length and almost .04 in breadth. The apex is bluntly pointed. They are so very thin shelled and brittle that it is almost impossible to remove one when dry from the ament to which it is attached. After rearing several thousand flies from these galls I noticed that there were at least two species in the box. They differed little in size or general appearance as viewed with the naked eye, but the magnifying glass showed that there were two genera. I examined the galls very carefully, but found but a single species, and from this the *Andricus* surely came, as I found a specimen in the unopened galls.

The other fly belonged to the genus *Neuroterus*. The new *Andricus*, which I call *A. exiguus*, is described as follows:

Head black. Antennæ pale yellow, fourteen jointed, first joint large, second large, globular, third as long as one and two together and subclavate, the rest equal and of medium length, not quite as long as the third, the last is very minute. The apical joints—10, 11, 12, 13—slightly dusky. Thorax shining yellow. Parapsides small and distinct. Scutellum yellow, slightly rugose, bounded posteriorly by a heavy ridge. Foveæ round and deep and near together. Abdomen shining, yellowish brown. Legs pale yellow. Wings subhyaline. Veins pale brown. Areolet present but faint. Radial area open, broad. Cubitus slender, reaching three-fourths the distance to the first transverse.

Female.—Head black. Antennæ thirteen jointed, dusky brown, joints 3 to 10 are in dry specimens much shrunken and wrinkled. Wings not clear. Veins distinct. Accurate measurements hardly possible (See *Neuroterus exiguus* B.).

Andricus crystallinus n. sp.

I have received at different times from Mrs. E. H. King, of Napa City, Cala., a singular species of gall which grows in clusters on the leaves of *Q. agrifolia*? usually but not invariably on the under side. Full grown galls are from .30 in length to .13 in diameter, but only a few seem to reach maturity. Some are mere points. They are often quite dense clusters and remind one of our common *A. flocci* Walsh, by their woolly appearance, but the bright pinkish wool is resolved by the magnifier into a beautiful mass of brittle crystalline fibres. The largest galls terminate in an elongated neck, the lower half of which is generally smooth, while the upper part branches out tree-like. So far as I can discover these galls contain neither woody fibre nor cellulose tissue. They bear no resemblance to any ordinary vegetable growth; but the body of the gall and the crystalline frost-work that covers it have a clear, semi-transparency, more or less pinkish, like beautifully tinted glass. The galls have a strong astringent taste, and are nearly pure tannic acid. On opening two mature galls I found two dead but fully matured gall-flies. Each gall contains two chambers, one above the other, with a very thin partition between them. The larva matures in the lower chamber.

The female flies, of which I have two, are .10 in. in length.

Head black. Antennæ dark reddish brown; unfortunately the antennæ are broken, but the first joint is large, club shaped, second very short and oval, third as long as one and two together, fourth scarcely shorter than the third, the rest very little less in length. Thorax black and shining, but with rather stout scattered hairs along the usual parapsidal and median lines. Scutellum narrow, rounded and corrugate. Foveæ not distinct. Abdomen black and shining and without hairs. Legs dark reddish brown. Wings large; veins distinct but slender. Areolet small. Radial area open.

This species differs materially from *A. echinus* O. S., though the galls bear a close resemblance to that species as described by Baron Osten Sacken. The black body of the insect, and the entire absence of clouds or spots in the subhyaline wings seem to separate them specifically.

Andricus Coxi n. sp.

Galls.—Woody swellings on small branches of *Quercus virens*, sent me several years ago by the late Prof E. T. Cox from Arizona.

The largest galls I have are three-fourths of an inch in diameter, and are nearly two inches in length. They bear a very close resemblance to the galls of *Andricus Suttoni* B., but the insects are quite different.

The flies in my collection are all females.

Head and thorax brownish red. Antennæ fourteen jointed, first large, second one-half as long as the first, smaller, third two and one-half times as long as one and two together, fourth as long as one and two together, five to fourteen inclusive short and dull dusky red. Thorax microscopically punctate. Parapsides deep, smooth and somewhat darker than the general surface of the thorax. Scutellum finely punctate, separated from the thorax by a broad, shining groove, which is scarcely foveate. Abdomen dark, almost black. Legs pale, brownish red. Wings large, subhyaline. Veins very slender, pale brown. Areolet small. Radial area open; cubitus slender, but reaching to the first transverse.

This species is smaller and of a lighter color than *A. Suttoni* B., and the venation differs from that species.

Andricus Ashmeadii n. sp.

Of this remarkably distinct species I took nine females ovipositing in the buds of *Q. bicolor*, April 13, 1890. They are black, except the antennæ and legs, which are dark reddish brown. Head, thorax, antennæ and legs hairy; hairs short and appressed. Antennæ fourteen jointed, first rather long and hairy, second short and about as long as thick, third medium size and length, fourth two-thirds and the fifth one-half as long as the third, sixth and seventh short, and the apical seven very short, the last two joints less distinctly separate than the others, and in one specimen the suture in one antenna is quite distinct and absent in the other. In still another specimen the fourteenth joint has a distinct suture, but the two parts only equal the sutureless joint in ordinary individuals. I mention these irregularities, for had my description been founded on either of these erratic individuals, it would not have answered for what is, undoubtedly, the normal structure.

Thorax—parapsides fine, narrow, distinct and even throughout; intermediate parallel lines (not grooves in this case) reach half way to the scutellum; line over the base of each wing very faint. Thorax irregularly punctate; the scutellum more coarsely so and more hairy. Legs very dark reddish brown, almost black, except at the joints. Ungues simple. Abdomen polished, shining black, except where it is covered with white hairs. The parts not so covered are the dorsal and ventral portions of segments two, three and four. This forms on the dorsum a perfect shining triangle, whose base is on the anterior margin of the second segment, and whose apex is on the posterior margin of the fourth segment. Wings rather large and clear. Veins distinct but not heavy. Color brown. Areolet small. Radial area open. Cusitus not quite reaching the first transverse. Body .14, antennæ .10, wings .16.

I find no species nearly resembling this, except *Acraspis pezomachoides* O. S., and *Biorhiza hirta* B., both subapterous species.

Named for that most indefatigable Hymenopterist, Willliam H. Ashmead.

Amphibolips verna n. sp.

One female taken ovipositing in the buds of *Q. ilicifolia* April 9, 1897, in Waterbury, Conn.

Head small, rugose, dusky black. Antennæ same color, fourteen jointed, first joint long, heavy, second one-half as long as the first but full size, third a little longer than the first two together and very slightly curved, fourth two-thirds and the fifth one-half as long as the third, sixth to the thirteenth equal, fourteenth one-half longer than the thirteenth. Thorax and scutellum small, both rugose and thinly covered with short hairs. The parallel lines of the thorax extend more than half way to the scutellum. Parapsides very obscure, lines over the base of the wings rather less so, all small. Scutellum not prominent. Fovæ large, shallow and not smooth. Abdomen large, .10 of an inch long by .08 inch deep. Anterior of the first segment sparsely hairy, as is also the posterior margin of the terminal segment and the sheath of the ovipositor. Entire abdomen shining, but microscopically punctate. The legs a uniform dark red. Wings large, subfuscous; veins brownish red, not heavy. Radial area open. Areolet large and nearer the anterior border of the wing than in most species. Cubitus slender, reaching to the first transverse. Body .18, antennæ .10, wings .20.

This species is distinct from *Amphibolips ilicifoliæ* B., the only species hitherto found on this species of oak.

Amphibolips longicornis n. sp.

Gall.—A large "oak-apple" with a very thin shell and a single larval cell in the middle of a soft, light and spongy mass, not unlike that of *A. spongifica* O. S. It is an inch and a half long and an inch and a quarter thick, My galls (only two) were received from Mr. W. R. Maxwell, of Palestine, Texas. Coming through the mail they were badly crushed and in such poor condition that I was

surprised, some months later, to find in the breeding cage a fine large gall-fly. Owing to my neglect it had been somewhat injured by mites. Species of oak unknown.

Gall-fly. *Male.*—Except the dull, opaque, brown antennæ the entire insect is black. Antennal joints fifteen, one and two equal, very short, second globular, third one and one-half times as long as the first two, fourth three-fourths as long as the third, fifth and following scarcely shorter than the fourth. Head small, shining black and corrugated. Thorax roughly ridged longitudinally. Parasides indistinct in the coarse corrugations. Scutellum very short and broad. Two prominent carinæ divide its dorsal surface into three equal, coarsely wrinkled parts. Foveæ large, round, deep and smooth. Abdomen small, very smooth, first segment (pedicel, ?) very short, second forms five-sixths of the entire length. Wings pale fuscous; veins distinct. Radial area open, short. Areolet small, a dark, brownish red cloud on it and the base of the radial area. Cubitus distinct and reaching to the first transverse. Legs broken. Body .16, antennæ .18, wings .17.

Amphibolips Gainesi n. sp.

Gall perfectly round and smooth, except the point of attachment to the acorn cup on which it grows. The point is small, it projects slightly and turns to one side. The color is pale brown, the outside not different in color or density from the hard cellular matter beneath. The larval cell is imbedded in, and is adherent to this mass. Size from one half to one inch in diameter. As my galls had wintered on the tree or lain upon the ground, the color of fresh galls may be different. Like *A. prunus* Walsh, this species developes on the edge of the acorn cup. It is larger than that species, which is dark and coarsely wrinkled when dry.

I think this new species grows on a variety of *Q. tinctoria.*

Gall-fly. *Female.*—Antennæ black, thirteen jointed, the joints moderately clavate, second very small and globular, the third equals in length the first and second together, the fourth is two-thirds as long as the third, the following joints gradually shorter to the thirteenth, which is long and faintly annulate. Head small, black; vertex coarsely corrugate. Thorax large, rounded, corrugate and microscopically hairy. Parapsides indistinct. Scutellum small, surface same as the mesonotum; foveæ small, near together, not shining or polished. Abdomen black; first segment one-third the entire length, basal one-half rather densely hairy, remainder beautifully and finely punctate, anterior border of the fifth segment with a few long white hairs. Sheath of the ovipositor with yellowish hairs. Legs small, short and reddish brown. Wings dark, smoky brown; veins heavy. Radial area open. Areolet small; veins enclosing it very broad and heavy, a very dark brown cloud on the apical portion of the wing. Body .27, antennæ .15, wings .24.

This fine species was received from President M. R. Gaines, Tillotson College, Austin, Texas.

Amphibolips badius n. sp.

Among the gall-flies that I captured at large is a female which I took foom the terminal bud of the tallest shoot of a thrifty clump of white oak sprouts. It was almost beyond my reach and I failed to discover whether it was actually ovipositing or not, but it is safe to assume that it was, either had, or was about to do so. The capture was made in early Spring, before the buds had made any appreciable advance. It belongs to the genus *Amphibolips,* and quite distinct from the many other species of this genus in my collection.

Gall-fly.—Head, antennæ, thorax and legs dark brownish red. Head and thorax covered with short, appressed red hairs. Antennæ short, only half as long as the body, thirteen jointed, first joint short, second very short and globular, third one-third longer than the two preceding taken together, fourth one-third shorter than the third, fifth and sixth gradually shorter; joints 3, 4, 5 and 6 larger at the apex than at the base. Face covered with appressed hairs, and there is an obscure, converging line from the base of each antenna to the mouth. Head rather small, not broader than the thorax. Prothorax anteriorly a very narrow shining band. Mesothorax full and rounded in front, finely and evenly but rather sparsely punctate. Parapsides—and other lines very indistinct, mainly because of the short, dense and closely appressed hairs. These obscure completely the parapsides posteriorly. Scutellum small, rounded and slightly elevated posteriorly, and the hairiness coarser and more dense than on the mesothorax. Fovæ small, almost obsolete. Legs darker than the thorax, densely covered with short, fine and closely appressed hairs. Wings shining, dark smoky brown; veins dark, almost black. Areolet small but well defined. Cubitus disappears a short distance from the first transverse vein. Abdomen large, black and shining, the second segment dorsally very long, nearly concealing all the others, but retreating ventrally to less than one-half the dorsal length. The sides of this segment are covered with a dense patch of shining reddish hairs. Body .25, antennæ .13, wings .22.

Acraspis Gillettei n. sp.

Galls three-tenths of an inch in diameter. Perfectly round, slightly uneven or pimply, each pimple crowned with a tuft of hair-like pubescence. They are of a pale ash gray color, but brown or black if long exposed to the weather. The larval cell is central and is kept in place by a spongy mass that is loosely fibrous on the inner surface of the gall. The cell is oval, .15 by .18. The shell very thin and hard. The galls affect the leaves of *Q. alba,* and, as a rule, the tops of tall old trees. They are rarely abundant, but occasionally occur in great numbers on an isolated tree or a small grove of oaks. I took this species at first for *A. niger* Gill., but it differs from that species in several particulars.

Gall-fly. *Female.*—Head, antennæ, thorax and legs dark, reddish brown. Antennæ fourteen jointed, the first and second large, the second three-fourths the length of the first, the third one and one-half the length of one and two together, the fourth equal to one and two together, and one-half as long as the third, sixth to the thirteenth equal, fourteenth pointed, short and only half as long as the thirteenth. Head short and broad; vertex hairy. Mesonotum small, narrow and hairy, though in some individuals shining and without hairs on the vertex. Collare very narrow and obscure, and with dense, fine, white hairs, and the anterior border of the mesonotum apparently depressed. Parapsides present but indistinct. Median lines absent. Scutellum small, hairy, hairs longer than on the mesothorax. Foveæ wanting. Abdomen large, shining black, second segment with fine microscopic hairs on the sides anteriorly. The abdominal segments are distinct and gradually shorter from the second, all compressed on the sides. Anal segment with a tuft of long hairs. Legs dusky and more decidedly reddish brown than the other parts of the body. Body .13, antennæ .11, rudimentary wings .05. These last are longer than in most supapterous species. No males.

Named for the Hon. Charles W. Gillette, for many years my genial companion in many an entomological ramble, and who collected the galls from which my specimens were bred from the ground beneath a large white oak on his lawn.

Callirhytis cerοpteroides n. sp.

Galls.—Slight enlargements of base of the annual growths of the shoots of *Q. tinctoria.* These swellings are often so inconspicuous that it is very difficult to distinguish them from the unaffected branches. Occasionally one is so developed as to attract notice. They are polythalamous, though only a few insects are found in even the largest. Found in July at Crescent Beach, Branford, Conn.

Gall-fly. *Female.*—Head shining, blackish brown, but with extremely minute hairs and a fine wrinkled surface on the vertex. Antennæ thirteen jointed, first and second large and nearly equal in size, third one-fourth less in length than the first two, fourth nearly as long as the third, and the following nearly equal in length and, in color, all are a dull brownish red to a darker shade towards the apex. Thorax black, shining but evenly transversely wrinkled, pleuræ and collare punctate. Parapsides converging from the collare to the scutellum. The parallel intermediate lines extend half way from the collare, a line over the base of each wing, all poorly defined, being merely faint depressions breaking the surface into longitudinal ridges. Scutellum smoother than the mesonotum. Foveæ large but shallow. Abdomen smooth, shining brown. Legs dark brown. Wings hyaline, and the veins so faint and colorless as to make definition impossible, even under a strong magnifier. Body .08, antennæ .06, wings .08.

Six bred specimens—all females.

Diastrophus niger n. sp.

I have had in hand for several years a few galls collected at

Wood's Holl from *Potentilla canadense*, by Miss Cora H. Clarke. They differ greatly in form and size, but I did not think the variations were specific and placed them together in the breeding box. The smallest are round or oval, not larger than the smallest peppercorn, and contains not more than one or two larval cells; while the largest are an inch long and one-fourth of an inch in diameter, and involve the whole stem and contain a dozen or more larval cells. Were the insects identical the form of the galls would not suggest any specific difference. When the large galls include a joint of the plant the joint is enlarged with the rest, but auxillary buds are not affected. In this it differs from *D. potentillæ* Bass., which affects the buds only and whose galls are monothalamous.

Cynipideous galls resembling the larger form are occasionally seen on the petioles of strawberry leaves, but I have never been able to rear any flies from them. From these I have bred both sexes, and after many attempts to settle the question of species I am always forced to the conclusion that there are really two species, though I can offer no very strong facts to support it. The large females, which I name *D. niger* Bass., are:

Body entirely black and shining. The head is short and broad and finely punctate. The antennæ thirteen jointed, the first and second reddish brown, the second very short, the others, including the first, all of moderate and uniform length. Thorax smooth, shining. Parapsidal grooves very deep and distinct. No other lines on the thorax. The mesothorax bounded posteriorly by a sharp transverse ridge. Scutellum medium size, rugose, hardly bi-foveate, though there is a scarcely discernible line dividing the large shining basal pit. Abdomen shining black, and of moderate size. The sheath of the ovipositor clear, translucent brown. Legs dark brown. Wings hyaline: veins dark, the first and second transverse heavy. Radial area short, broad and open, and with a dark cloud at its base. Areolet wanting. Cubitus heavy and thickest at its union with the first transverse. Body .08, antennæ .06, wings .10.

Seven specimens.

Diastrophus minimus n. sp.

Galls small, globular or oval blisters rising abruptly between the nodes of the potentillæ stems. They are not often more than .06 inch in diameter and contain one or two larval cells. They are dark and smooth.

Gall-flies. *Females.*—Black, except the legs which are a pale reddish brown. Thirteen joints, first and second ovate, third straight, remaining joints short and of uniform length. Thorax smooth and shining. Parapsides closely convergent posteriorly. Scutellum medium size. Foveæ large, shining and rather shallow. Surface of the scutellum finely and regularly rugose. Abdomen smooth and

shining. Wings very faintly dusky; veins strong, very dark and well defined. Areolet subobsolete. Cubitus reaches the first transverse. Radial area open. Vein at its base (second transverse) very dark and thick. Body .06, antennæ .06, wings .07.

Male.—Antennæ fourteen jointed. Legs a shade lighter yellowish brown than the female. Otherwise as the female, except the smaller size. Body .05, antennæ .05, wings .07.

I may add that my collection contains one branch of potentilla on which I find a gall of the above species and, at the node, one of *D. potentillæ* B.

Dryophanta discus n. sp.

Galls.—Among the galls sent me several years ago by Mrs E. H. King, from Napa City, Cal., were a few specimens from which no insects appeared, but from which I removed three dead but perfectly developed individuals. The galls were circular, flat sessile disks growing in clusters on the under sides of the leaves of some species of oak, closely resembling *Q. alba*; but I am not sure this oak grows in that section. The galls are hardly one-eighth of an inch in diameter, and except in size and color might be taken for what is, I think, called the blue spangle gall, not uncommon on the white oak in the Atlantic States. It is smaller and lacks the blue color.

The shape suggests the trivial name.

Head black. Antennæ thirteen jointed, joints one and two rather large, subequal. Third long, fourth two-thirds as long as the third, remainder gradually shorter, all yellowish red. Thorax smooth, shining, with a few scattered hairs and deep parapsidal grooves. Scutellum slightly rugose. Foveæ not distinct. Abdomen dark, shining brown. Legs dark brown. Wings rather large; veins very pale, almost colorless. Areolet wanting. Cubitus nearly obsolete. Radial area open. Body .06, antennæ .05, wings .07.

Three specimens.

Dryophanta parvula n. sp.

I found this minute species, of which I have but a single specimen, ovipositing in the buds of *Q. ilicifolia*, May 26, 1871.

Gall-fly.—Entire body black. Head a little broader than the thorax. Antennæ thirteen jointed, first joint large, short and dark, second large, globose and equalling the first in length, third rather long and slender, remaining joints equal in length, two to eleven yellowish brown, twelve and thirteen dark, dusky brown. Thorax—the two median lines, which extend two thirds the distance from the collare to the scutellum, the parapsides and the lines at the base of each wing are all smooth and shining. The parapsides are not broad, and they converge closely at the scutellum. Scutellum finely wrinkled or rugose. Foveæ wanting. Abdo-

men polished and shining. Legs dark, translucent brown. Wings hyaline; veins faint and slender. Radial area open, broader than usual. Areolet wanting. Body .05, antennæ .05, wings .07.

Dryophanta longicornis n. sp.

Among the galls from which *Andricus exiguus* n. sp. and *Neuroterus exiguus* n. sp. were bred were three or four of an altogether different sort. They were moderate enlargements of the upper portion of very young and tender shoots, not at all prominent; and now that these shoots are dry and shrunken I am not able to indentify them among the galls in the box. I did not separate them at the time, supposing them to be too immature for developing, and I could not have done so without injuring the other species. Of course I am not sure that the three large flies found in the box came from these galls, but the presumption is that they did so. At any rate, the flies are of an undescribed species, and their relation may be determined later.

Gall-fly. *Male.*—Head black. Antennæ long, fifteen jointed, first and second short, globose and of equal length, third is one-third longer than the first two, fourth equal to the first two, fifth almost equal to the fourth, the following gradually shorter, and all of a dark brown color. Thorax black and shining in that portion within the deep parapsidal grooves. Median and alar lines wanting. Scutellum coarsely rugose and with short, scattered hairs. Fovæ obsolete, but a slight depression takes their place, this is rough like the rest of the scutellum. Abdomen black and smooth. Legs rather pale red or reddish brown. Wings large and smoky brown; veins all distinct and reddish brown. Radial area open. Areolet present. Cubitus full length, but slender towards the first transverse. Body .09, antennæ .11, wings .12.

Female.—Body .10, antennæ .11, wings .12.

Two males and one female.

Dryophanta pallipes n. sp.

Galls.—The rapid Spring growth of thrifty young white oak shoots is sometimes suddenly checked by the appearance of this gall at their apex. The gall does not prevent the development of the leaves below it, but immediately surrounding its base half a dozen or more brown, thread-like bodies from three-fourths of an inch to an inch and a half in length appear. Occasionally two or more of these are narrowly strapped shape, and suggest that they are all undeveloped leaves. The gall, a mere larval cell at the center of this cluster, is blackish brown, thin shelled, oblong-oval, .09 of an inch in length and .06 in diameter. The insect emerges from the apex of the cell, leaving it resembling an eggshell with

the end removed. This is a rare species, though I have found it in a certain locality several years.

Gall-fly. *Male.*—Body black. Head finely wrinkled, wider than the thorax. Antennæ fifteen jointed, first joint smaller than the second, club shaped, second globose, both pale, third to the fifteenth changing gradually from pale to a dark dusky brown. Thorax—the parapsides very distinct, closely converging at the scutellum. The space between these lines is polished and smooth and outside finely punctate. Scutellum rather coarsely rugose; foveæ wanting. Abdomen petiolate, compressed, shining black. Legs very pale brownish yellow. Wings subfuscous; veins heavy reddish brown. Radial vein heavy and ending very abruptly within the margin of the wing. Areolet distinct. Cubitus heavy, reaching the first transverse.

Females.—Both broken. The antennæ paler and the joints shorter than the male, and the abdomen is below the average size in this genus. Body .09, antennæ .08, wings .09.

Waterbury, Conn. One male and two female specimens.

Holcaspis fasciata n. sp.

For nearly forty years the gall of the fine species I now describe has been a familiar object in my entomological rambles, and during that time but few years passed that I did not make some effort to rear the gall-flies. Two years ago I succeeded in doing this, and I have before me a large number of fully developed insects.

The galls are found almost every year in September on the thrifty Summer growth of *Quercus ilicifolia*. They are arranged in linear clusters near the tips of the shoots, somewhat after the manner of *H. duricoria*. During their growth they are mottled light and dark green color, and these spots often are arranged in broad bands that suggest the trivial name. When full grown they range from one-fourth to one-half an inch in diameter. They are nearly but not exactly round. When fully grown they drop to the ground at a touch, and their pretty appearance soon changes to a dull black.

The large larval cell is imbedded in a fine cellular substance that, in ripe galls, is of a deep tan color. Measured from the base to the tip of the cell it is .45 of an inch long, and across the widest part towards the base .37 in large specimens. When collected I immediately placed the galls on the ground in a condition as nearly normal as possible. At this time there were no larvæ in the galls, but in the exact centre a minute viscid point that seemed a mere speck of jelly. There was, certainly, nothing that looked like an organism, even under a strong magnifier. In the course of the Autumn the

dot of jelly developed into a larvæ that by Winter reached full development. I watched them through the next Spring and Summer, and towards September had the pleasure of finding mature imagoes in the breeding box.

The flies, all females, are a remarkably large and strong species.

The head small and of a yellowish brown color. The face smooth and a shade lighter than the cheeks and vertex. The antennæ has fourteen joints, and is a dusky brown throughout, and the annulations are so close as to be counted with difficulty, the first joint is rather stout, the second quite small and oval, the third a trifle longer than one and two together, the remaining of uniform length. The thorax is large, shining and almost black. It seems smooth under an ordinary low-power glass, but a high power shows it to very finely and most beautifully crackled. The parapsidal grooves are deep and broad. The scutellum is not large but is very deeply wrinkled or corrugated. The foveæ are large and not distinct. The abdomen is very large, and vertically, unusually deep. There are a few small hairs on the shoulder of the anterior segment. The legs are brownish red. The wings are subhyaline; the veins rather heavy and quite distinct. The areolet present. The cubitus reaches to the first transverse, and the radial area is open. Body .18, antennæ .12, wings .18.

Loxaulus spicatus n. sp.

Galls.—A cluster of galls attached to a small branch of some variety of *Quercus virens*. They are a dark reddish brown and resemble more nearly, than anything else I can think of, a rather irregular shaped nubbin of red dent corn. There are twenty-five or thirty galls in the cluster, and it measures about an inch in diameter. The larval cell is imbedded in the base of each separate gall in a dry cellular tissue, and in this it somewhat resembles the chit in the kernel of corn.

My galls have been in hand many years, having been collected in Arizona by the late Prof. E. T. Cox. How this fine and distinct species escaped my attention so long I cannot tell.

Gall-fly.—Color brownish red. Head paler than the thorax. Antennæ thirteen jointed, first short, second almost globose, thirteenth longer than one and two together, it is slender and club shaped, fourth and following of uniform length and very distinctly defined and heavier than the third. Head broader behind the eyes. Ocelli black, middle one less distinct than the lateral. Thorax heavy. Parapsides obscure. Two faint, parallel median lines reach from the collare one-third of the distance to the scutellum. Scutellum small, rounded, hairy. Foveæ very small. Abdomen highly polished, shining, dark brown, basal segment with a few scattered hairs on the anterior portion. Legs dull reddish brown. Tibia and tarsi more dusky. Wings subhyaline, microscopically hairy; veins pale brown. Areolet rather small. Cubitus reaches just half way to the first transverse. Radial area open. Radial vein ends abruptly before reaching the margin. Body .10, antennæ .09, wings .12.

Six specimens, all females.

Neuroterus umbilicatus n. sp.

The galls of this species are found in great numbers on the under surface of the leaves of *Q. bicolor*. Four or five hundred have been counted on a single leaf. They are small, circular, flattened and concave, with a minute conical elevation in the centre of the concavity. They are about .07 of an inch across and .05 in depth, and the pit is only .04 across. Beneath the conical elevation lies the minute larval cell. Except the concavity described, which is smooth, the surface is covered with short, stiff hairs, much like the under surface of the leaf. The galls are easily detached, but leave an indentation which is seen as a flattened elevation on the upper surface of the leaf. The peculiar form of these galls suggests the trivial name.

The gall-flies are all females, and the entire body is shining black and highly polished.

Antennæ short and very slender, except the first and second joints which are very thick, the second quite as thick as the first, but a little shorter and less tapering towards the base, the remaining are very slender, the third as long as one and two together, the others (4 to 13) short, subequal, the last three forming a thickened club with obscure articulations. The polished thorax without hair or grooves. The scutellum small. The foveæ wanting. Abdomen as deep as long, and in shape subtriangular, like most of the species of this genus. Legs clear, dark, shining brown, and in some individuals nearly black, and in all cases lighter at the joints. Wings hairy; veins pale. Areolet small but distinct. Radial area open, long and narrow and forming at its base with the second transverse a perfect parallelogram. Cubitus slender, equal throughout, and reaching quite to the first transverse. The first quite dark brown, the other veins pale or colorless. Body .06, antennæ .04, wings .07.

Described from twenty-five specimens in my collection.

I collected these galls in countless numbers for many years, and made numerous unsuccessful attempts to rear gall flies from them. Flies in vast numbers were bred from them, but all bore the unmistakable marks of *cynipideous parasites*. These repeated failures led me to wonder if there might not be, after all, species bearing all the characters of the parasites that were true gall makers. It is true that I knew of no such species, and I did not forget that proof of this negative sort and hardly less in amount led Dr. Fitch to publish a winged parasite as the originator of his *Cynips ficus* galls, which, later, Dr. Walsh discovered were produced by the subapterous *Biorhiza forticornis*. I, too, had reared millions of parasites from the galls *Neuroterus floccosus* B. before a single gall fly was discovered. Visiting on a warm morning in Spring an oak that

had for years furnished these galls in abundance, I found a species of *Neuroterus* laying eggs in the buds of this tree. Busy capturing specimens from the low branches of the tree it was sometime before I discovered that my clothing was covered with flies of the same species. Having but a few minutes left for collecting, I was only able to collect some thirty individuals from the buds and my clothing. I left unwillingly, to return in the afternoon. By afternoon the weather had turned cold and not an insect of any kind could be found.

I made visits later and on more favorable days, but no flies were seen. On one of these visits I took up a quantity of sand and leaf-mould under the tree, and sifting it carefully found many empty galls and two that contained perfect living gall-flies. One of these I destroyed in opening, the other proved to be identical with those captured a few days before, and from it the above description is, for the most part, drawn.

In the latter part of May and the beginning of June the young galls were nearly full grown and as abundant as ever before. At this time I had in my breeding boxes, in damp earth, galls of this sort gathered the Autumn before, and from them were appearing parasites in considerable numbers. Visiting the tree at this time I found from one to five of these flies actively at work among the umbilicus galls. I cannot say that I actually saw them stinging the galls, but we may reasonably suppose they were doing so, and it is easy to understand why so few gall-flies are so produced from the almost countless number of galls of this and some other species. I have seen parasitic hymenoptera stinging, but not often. My favorite oak has recently been cut down and a railroad siding covers the stump, but I hope to find another as good on which to follow up my investigations.

Neuroterus tectus n. sp.

I found, April 29, 1874, eight or ten gall-flies belonging to the genus *Neuroterus* ovipositing in the buds of a low spreading bush of *Q. prinoides*.

The description is as follows:

Head black. Antennæ thirteen jointed, first and second short, third equal to the first two, fourth two-thirds as long as the third, the following short, subequal to the thirteenth which is very short. Thorax black and smooth; parapsides none. Scutellum small, rounded, polished and separated from the mesothorax by a broad, arcuate groove. Abdomen black, small, in outline an equi-

lateral triangle. Legs a clear pale translucent brown at the joint, changing to an almost glassy black in the middle of the femur and tibia. Wings hyaline, veins dark, distinct, but not heavy. Radial area long and narrow and open. Areolet relatively large. Cubitus full length. Body .05, antennæ .05, wings .06.

Visiting the same bush, June 10th, I found numerous galls in the shape of an enlargement of the base of the young branches. In some cases the galls hardly increased the size of the branch or interfered with its growth; in others it entirely checked its extension.

The insects, which had been very numerous, had mostly left, but from the galls I collected I bred at least a hundred flies—male and female. The females do not differ in any material feature from those taken ovipositing.

Male.—Head, thorax and abdomen shining black. Antennæ slender, fourteen jointed, first and second short, third one-third longer than the first two, fourth equal to one and two together, fifth to thirteenth equal, fourteenth short. Color a clearer shining brown than in the female antennæ.

From Waterbury, Conn.

Neuroterus perminimus n. sp.

This is the smallest species from which I have ever reared any gall-flies. They lie imbedded in the lamina of white oak leaves, and show on both sides, but more distinctly on the upper side. They are oval, pustule like bodies, only .04 long, .03 wide and .03 deep. I have only met them in a limited locality in Rockport, Ohio. In some cases two hundred can be counted on a single leaf of ordinary size. Small as they are, they are so infested with parasites that comparatively few true gall-flies ever reach maturity. I have reared a few of both sexes. The galls reach their growth about June 25th, and the flies hatch out before July 10th.

Female.—Head black. Antennæ thirteen jointed, first and second joints rather large, the rest short and dusky brown. Thorax very dark, almost black. No parapsidal lines. Scutellum very small and somewhat rough. No foveæ. Abdomen short and black. Legs translucent brown but paler at the joints. Wings hyaline: veins small but distinct. Areolet very small. Radial area long, narrow and open.

Male.—Head dark but not quite black. Antennæ fourteen jointed. Thorax highly polished and a fine dark brown. Abdomen very minute, slender, pedicelled and triangular and a reddish brown. Legs pale and almost glassy in appearance. Body .03, antennæ .03, wings .04.

Note.—I have received within a week fresh galls of this species, but the flies had nearly all escaped on their arrival, June 28, 1900.

Neuroterus exiguissimus n. sp.

Galls found in Autumn on the underside of leaves of *Q. alba*,

arranged along the sides of the midvein or principal veins, closely sessile but not easily separable from them, and showing an indentation in the lamina of the leaf where they grow, and a small, smooth elevation on the opposite side. They are hairy or coarsely flocculent, like the galls of *N. floccosus* B. The lateral diameter is about .10 of an inch; the vertical .05. Denuded of the dense woolly cover ing the gall, which is the larval cell, is smooth, hemispherical (sometimes oval) and .03 in the lateral diameter. They chiefly affect the leaves at the ends of young oak branches. These leaves are generally curled and distorted, though this does not seem to result from the attacks of the gall insect. I have these galls from Providence, R. I., and Amherst, Mass., and for several years past I have found them quite abundant in Waterbury, Conn. They resemble, individually, the galls of *N. floccosus* B., but are smaller and are confined to the large veins of the leaf, mostly to the midvein, and they grow on *Q. alba*, while *N. floccosus* is found on *Q. bicolor*.

All the gall-flies I have reared are females.

The head is broad and black. The antennæ thirteen jointed, first and second joints are black, the third to the thirteenth dusky brown, slender and of equal length, the first joint is short, the second larger and ovoid. The thorax smooth. The scutellum smooth, shining, a curved groove, but no foveæ at its base. The scutellum is smoother and more polished than the mesonotum—this is unusual, if not unique. Abdomen compressed, smooth and black. Legs dark brown, with pale joints. Tarsi dusky. Ungues black. Wings large, hyaline; veins pale. Cubitus slender, not easily traceable. Areolet large, but the veins bounding it laterally scarcely visible. Radial area open. Body .05, antennæ .04, wings .04.

While there is a close resemblance between this species and *N. floccosus* B., I hesitate to pronounce the differences merely varietal. I do not care to become a species maker, founding new species on slight variation; but until the history of our Cynipidæ is better known, it will be impossible to determine, in some cases, what are true species and what are only varieties.

Neuroterus exiguus n. sp.

After the discovery of a species of *Neuroterus* in my boxes of *Andricus exiguus*, I made at least three trips to West Rock to discover the home of the new species, sure that the galls of the two were not identical. The study of an unlimited amount of material revealed aments that were of abdormal size, some of them two or three times the ordinary diameter, some with nodular enlargements, but all more or less hidden in the florets. After repeated efforts I finally found some of the Neuroteri in these galls and the mystery

was solved. These galls are so small and succulent that they soon shrivel up and disappear. When once found it was easy to discover them in considerable numbers, but even now I fail to detect them among bunches of dry *Andricus* galls.

The flies are described as follows:

Female.—Head large. Antennæ thirteen jointed, first large, ovate, second much smaller, third equal to the first two, they are of uniform length, very short, color clear, semi-translucent brown, all except the first two very slender and easily broken, and often presenting a shrunken appearance. Thorax relatively large, polished, very black, the surface is rumpled owing to its extreme thinness, no two specimens being alike in this respect. Scutellum small, rounded, shining black, as is also the transverse groove at its base, this groove is large and incurved. Abdomen small, black, less brilliant than the thorax, triangular through the retraction of all the segments within the first. Legs dark, clear brown but paler at the joints. Wings large, smoky and hairy; veins large and strong. Areolet large. Cubitus reaching quite to the first transverse. Radial area open. By a curvative in the second transverse at the base of the areolet, the outer angle is acute and the inner a right angle. In most of the species of this genus they are both right angles. Body .06, antennæ .04, wings .07.

Male.—Black, except the antennæ and legs. Antennæ fifteen jointed, all clear brown and very frail and slender, except the first two. Legs same color as the antennæ though a little paler at the joints. The whole insect frail and delicate. The abdomen long pedicellate, shining brown. Wings as in the female. Body .06, antennæ .05, wings .07.

Neuroterus Gillettei n. sp.

Gall.—A pustule like enlargement of the petioles and mid-veins of the leaves of *Quercus obtusiloba*. Polythalamous and quite irregular in size and form.

My dry specimens are much shrunken and distorted.

Gall-fly. *Male.*—Head black. Antennæ fourteen jointed, first joint short and obscure, brownish, second large, ovate, almost colorless, third long and slender, all except the first joint more or less translucent, fourth to the fourteenth very short. Thorax rounded, shining black. Parapsides—as in all of this genus—wholly absent. Scutellum beautifully polished, black, separated from the mesonotum by a broad, shining groove. Abdomen petiolate, petiole pale or colorless, following segments dark. The abdomen is small and triangular. The legs are nearly colorless. Wings large, hairy and somewhat dusky: veins all very distinct, yellowish brown. Areolet large. Radial area long, open. Cubitus reaches in full size to the first transverse vein. Body .05, antennæ ?, wings .07.

Female.—Antennæ thirteen jointed. Abdomen smaller than is usual in the females of this genus. No petiole. Legs pale, with shining, translucent brown in the middle of the femur and tibia. The female measures the same, even in the wings.

Named for Prof. C. P. Gillette, of Fort Collins, Colorado, whose studies have so greatly augmented our knowledge of American Cynipidæ.

Neuroterus fragilis n. sp.

Galls.—They resemble in form and structure the galls of *N. irregularis* O. S. and *N. majalis* Bass., but are much smaller and of greater density than either of these species. They are a pale yellowish white and occur on the leaves of a small oak in southern California, probably *Q. virens* or a related species. The galls are polythalamous, but even the largest contain very few individuals.

Gall-fly. *Male* and *female*.—Color pale translucent brown, except the minute abdomen which is dusky brown. Abdomen very long, pedicellate, the remaining segments forming a minute, equilateral triangle. Legs very pale and slender. Wings subhyaline; veins very distinct but small. Areolet present. Radial area open. Antennæ of the eight males in my collection all broken at the first or second joint. The female antennæ has fourteen joints, the first small and short, second relatively very large, the following very short. Body .05, wings .08.

A very minute species and differing materially from all others of this genus known to me.

Collected at or near San Diego, Cal., by Mrs. D. B. Hamilton.

Neuroterus consimilis n. sp.

Gall.—Leafy and greatly foreshortened and enlarged branchlets of the white oak. Of solid, woody texture, polythalamous, one-half an inch thick (dry specimens), and three-fourths of an inch long. They mature in mid-Summer.

Gall-fly. *Male*.—Head shining black, broader than the thorax. Antennæ fifteen jointed, longer than the body, first and second joints short, the second globose, those following nearly equal in length, dull dusky brown. Thorax and scutellum dull black, microscopically punctate. Parapsides reduced to two brief divergent lines beginning on the scutellum. Groove separating the mesonotum from the scutellum broad and shining in the middle, but no distinct foveæ. Scutellum small. Abdomen extremely small, very black. Legs—posterior pair dark, nearly black, except at the joints, middle and the anterior pairs a uniform dull yellowish brown. Wings hyaline; veins very dark and well defined. Areolet small. Radial area open. Body .06, antennæ .08, wings .08.

Female.—Body black. Antennæ in my four specimens are broken. The basal joints, which still remain, darker than those of the male. Thorax—parapsides wanting. Foveæ absent, but the transverse groove rather broad and smooth. Abdomen black, large, the terminal segments retracted within the first, which is vertically very wide or deep. The posterior pair of legs are even darker than those of the male. Wings same as the male. Body .08, antennæ .07, wings .09

Four females, two males. Waterbury, Conn.

Neuroterus dubia n. sp.

This species was found in a box of galls of *A. prionosus*, but no galls appear from which they seem to have come. Both sexes.

Female.—Black. Head—vertex microscopically crackled. Antennæ fourteen jointed, joints one and two equal in length and size, rather large, third slender and one and one-fourth as long as the first two, fourth short, about two-thirds as long as the third, the remaining very short, the fourteenth very minute and the suture indistinct, joints one, two, three and four pale yellowish red, the remaining dusky reddish brown. Thorax high and rounded, hardly smooth, but shining. Two diverging grooves from the scutellum to the base of the wings. Scutellum finely and evenly rugose. No foveæ, but a broad groove separates the thorax and the scutellum, broadest in the centre. Abdomen shrunken in dry specimens, but smooth and shining and vertically deeper than long. Legs pale yellowish. Wings subfuscous; veins slender, distinct. Radial area open. Areolet relatively large. Body .06, antennæ .06, wings .08.

Male.—Antennæ fifteen jointed, joints one and two rather shorter than in the female, and the first, at the base, dark and shining, third long and pale yellowish brown and semi-translucent, the remaining joints short and of a very dark opaque brown. In no other species have I noticed the sudden transition of color seen in this. Head, thorax, scutellum and the minute, long, pedicelled abdomen dull shining black. Legs pale, but less so than in the female, inclining to yellow. Wings as in the female. Body .06, antennæ .06, wings .08.

Five male and three female specimens.

Neuroterus distortus n. sp.

The galls are young branchlets of *Q. bicolor*, slightly enlarged at the base and scarcely distinguishable from ordinary twigs. The enlargements about half an inch long, leafy, polythalamous, the leaves often curled and distorted, and the twig dwarfed in length and turned to one sid. They are so inconspicuous that they would escape notice were it not for the rosette-like cluster of leaves surrounding them. My specimens, collected in considerable numbers from a single tree, bear date May 25, 1893. The largest galls produced about a dozen insects.

Male.—Except the antennæ and legs smooth, shining black. Antennæ fourteen jointed, joints one and two of moderate size and length, third equal to the first two, fourth two-thirds as long as the third, fifth to the twelfth equal, thirteenth short, fourteenth very short, all dusky brown. Thorax high, smooth and rounded. Scutellum rounded and perfectly smooth, separated from the mesothorax by a deep, shining groove. Abdomen with a slender petiole. The following segments, seen laterally, form a globular disk, the length and breadth being equal. Legs clear, pale brown, the middle of the femur darker but almost transparent, and paler at the joints. Wings large, subhyaline; veins pale, clear brown, all distinct and complete and of equal size. Areolet large. Radial area long and narrow. Body .06, antennæ .05, wings .08.

Female.—Black. Antennæ thirteen jointed and as in the male, except that the third is shorter and the whole a shade darker, and the abdomen is not petiolate. Body .06, antennæ .05, wings .07.

INDEX.

The names of new genera and of new species are followed by the name of the Author.

PAGE

Acanthocnemis.....295
Acanthopus..... 68
Acanthosmia 76
Acanthosmioides *Ashmead*..... 76
Acerotosmia 75
Acnemia 276
Acraspis Gillettei *Bassett*.....323
Acroneuria.....241
pacifica *Banks* 242
Adistemia *Fall*.....113, 141, 187
watsoni 141
Ædes 281
Agapostemon..... 91
Aglæ 68
Agrypnetes curvata *Banks* 252
Alcidamea 74
Allodape..... 82
Amalopsis 293
Amblys..... 75
Amegilla 60
Ammobates..... 81
Ammobatoides 81
Amphibolips badius *Bassett*... ...323
Gainesi *Bassett*.....322
longicornis *Bassett* ...321
verna *Bassett* 321
Ancyla 90
Ancyloscelis..... 64
Andineta 71
Andrena..... 90
Andrenidæ 55, 86
Andreninæ 87
Andricus Ashmeadii *Bassett* 320
Coxi *Bassett* 320
crystallimus *Bassett*.....319
exiguus *Bassett*.....318
ignotus *Bassett* 317
incertus *Bassett*.....317
Kingi *Bassett*.....316

PAGE

Andricus obtusilobæ *Bassett* 316
operatola 315
parmula *Bassett* 312
patiens *Bassett*.....312
perditor *Bassett*.....313
piperoides *Bassett*.....314
pruinosus *Bassett* 311
pulchellus *Bassett*.....314
tuberosa *Bassett* 311
Andronicus 74
Anopheles 279
Anthidiinæ.....72, 78
Anthidium..... 78
Anthocopa 76
Anthoglossa..... 94
Anthophora 60
Anthophoridæ 55, 58
Anthophorula 63
Antistrophus leavenworthi *Bassett*...310
Apidæ 54, 56
Apinæ 56, 57
Apis 57
Apista 88
Apoidea 49, 53
Arctosmia..... 75
Arsapnia..... 241
Ashmeadiella 73
Asphondylia 273
Asynarchus centralis *Banks*.....253
tristis *Banks* 254
Atabarba 290
Augochlora 91
Bætini 247
Bætis 247
Bætiscini 246
Belonia *Fall*.....113, 142, 187
unicostata 142
Bees, Classification of..... 49
Biareolina 83

PAGE

Biastes 80
Bibio 295
Bibionidæ 294
Blepharoceridæ 297
Boletina 276
Bombidæ 54, 57
Bombomelecta 66
Bombus 57
Brachynomada 69
Brachypremna 285
Cænini 247
Cænonomada *Ashmead* 68
Cænoprosopis 82
Callandrena 83
Callibætis 247, 248
americanus *Banks*, ..248, 250
californicus *Banks*. ..248, 249
coloradensis *Banks*...248, 250
ferrugineus 248, 250
floridanus *Banks* ...248, 249
fluctuans 248, 249
montanus 248, 249
pallidus *Banks* 248, 251
tessellatus 248, 250
undatus 248, 249
Callirhytis ceropteroides *Bassett*. ...324
Calliopsis 85
Callomelitta 89
Calyptobium 107, 184
Camptocladius 282
Camptopœum 84
Capnia 241
Capnini 240
Capnura *Banks* 241, 245
venosa *Banks* 245
Cartodere 113, 135, 186
argus 136, 139
costulata 136, 137
elegans 136, 140
filiformis 136, 138
filum 136, 139
intermedia 136, 139
quadrifovealata *Fall* 136
ruficollis 136, 137
Caupolicana 94
Cecidomyia 273
Cecidomyiidæ 273
Centris 59, 61
Centrophilum 247

PAGE

Ceratina 69
Ceratinidæ 55, 69
Ceratopogon 284
Ceratosmia 74
Ceroplatus 275
Chætopterygopsis parvula *Banks*...256
Chalcidoma 78
Chalcosmia 75
Chelostoma 73
Chilicola 81
Chironomidæ 282
Chironomus 282
Chloroperla 241
minuta *Banks* 244
Chrysantheda 67
Chrysopidæ 251
Cilissa 89
Clisodon 60
Cloeon 247
Cnephæophila 278
Cockerellia 85
Cœlioxinæ 79, 80
Cœlioxoides 68
Cœlioxys 82
Cænonympha 299
ampelos 303
brenda 306
californica...299, 301, 302
ceres 301
elko 304
eryngii 302
galachinus 301
haydenii 308
inornata 307
kodiak 302, 303
laidion 306
mixturata 303
ochracea 305
pamphilus 308
pulla 302
tiphon 303, 306
yukonensis 303
Colletes 94
Colletidæ 55, 93
Conimomus 113, 119, 185
australicus 120, 121
constrictus 120
nodifer 120, 121
Conithassa 122, 185

PAGE

Corticaria....145, 146, 187
amplicollis *Fall* 149, 159
apicalis *Fall* 149, 161
brevicornis *Fall*....149, 164
carolina *Fall*....149, 158
columbia *Fall*....148, 155
cribricollis *Fall* 149, 159
dentigera 149, 162
elongata 150, 165
ferruginea....150, 165
fulva....148, 151
incerta *Fall*....149, 161
inopia *Fall*....148, 153
occidua *Fall* 149, 162
parallela *Fall*....148, 152
planula *Fall* 148, 154
poculifera *Fall*.... ..149, 157
prionodera 149, 157
pubescens....148, 150
rudis *Fall* 148, 150
salpingoides 148, 155
serrata 149, 160
serricollis 149, 156
temporalis *Fall* 149, 164
tenuipes *Fall*....149, 163
valida *Fall* 148, 153
varicola *Fall*....148, 151
Corticariini....106, 144, 187
Corticarina....167, 170, 188
Cortilena....167, 169, 188
Corynura.... 91
Crocisa 66
Crocisaspidia *Ashmead*.... 68
Ctedonia 292
Ctenioschelus 68
Ctenophora 285
Ctenoplecta 77
Ctenosmia 76
Culex....280
Culicidæ 279
Curupira....298
Cyaneoderes *Ashmead* 70
Cyathocera.... 77
Cylindrotoma 293
Cynipidæ 310
Dasycerini....106, 110, 184
Dasycerus....110, 184
angulicollis 112
carolinensis....111

PAGE

Dasypoda 86
Diadasiella *Ashmead* 64
Diastrophus minimus *Bassett* 325
niger *Bassett* 324
Dicranomyia 287
Dictyopteryx 241
irregularis *Banks* 243
Didonia.... 93
Dilophus....294
Diotrepha....289
Dioxys 82
Diphaglossa 94
Diphysis.... 73
Diplosis 273
Diptera, South American....260, 273
Ditomyia.... 274
Dixa ... .285
Dixidæ....285
Dœringiella 67
Dryophanta discus *Bassett*....326
pallipes *Bassett* 327
parvula *Bassett* 326
longicornis *Bassett*....327
Dufourea 83
Ecplectica 63
Elephantomyia 289
Elliptera....290
Emphor 60, 61
Emphoropsis *Ashmead*.... 60
Enicmus....113, 121, 122, 123, 185, 186
aterrimus 123, 129
consimilis 123, 126
cordatus....124, 133
crassipunctatus *Fall*..124, 130
crenatus 123, 127
desertus *Fall* 123, 125
duplicatus 123, 130
fictus *Fall* 124, 131
hirtus 123, 125
læviventris *Fall*....123, 128
maculatus....123, 130
mendax *Fall*....124, 132
mimus *Fall*....124, 131
minutus 123, 127
nigritus *Fall*....123, 126
protensicollis 123, 124
strenuus *Fall*....123, 128
sulcatulus *Fall*....124, 134
suspectus *Fall*....123, 125

PAGE

Enicmus tenuicornis 124, 134
vanus *Fall*.....124, 132
ventralis *Fall* 124, 133
Entechina 64
Epeicharis 67
Epeoloides 68
Epeolus..... 67
Ephemera 247
Ephemerella 247
Ephemeridæ 245
Ephemerini 246
Epicharis 62
Epicharoides 67
Epicolpus 61
Epimelissodes *Ashmead*..... 63
Epinomia *Ashmead*..... 88
Ericrocis..... 66
Eriocera 292
Erioptera 290
Erythrosmia 75
Euaspis 78
Eucera 63
Euglossa 58
Euglossidæ 54, 58
Eulema 58
Eunomia 88
Euryglossa 96
Eurytis..... 67
Eusynhalonia *Ashmead*..... 63
Euthyglossa 60
Exærete 67
Exomalopsis 64
Exoneura..... 82
Florentina..... 67
Fuchsina *Fall* 145, 183, 189
occulta *Fall*.....183
Furcosmia 76
Gastropsis..... 89
Geranomyia..... 287
Gnophomyia 291
Gnoriste 276
Goniomyia 291
Gyrodroma 73
Habropoda 60
Hæmagogus 279
Halictinæ 87, 90
Halictoides 83
Halictus..... 92
Haplusa 274

PAGE

Helicosmia..... 75
Hemihalictus..... 83
Heptagenia 247
Heptagyia 284
Heriades..... 73
Hesperapis 83
Hesperinus 296
Heteronycha 280
Heteroplectron mexicanum *Banks*...257
nigripennis *Banks*....256
Hexagenia 247
Holcaspis fasciata *Bassett*.....328
Holcopasites *Ashmead*..... 82
Holoparamecus.....106, 107, 184
caularum 107, 110
floridanus *Fall* 107, 109
kunzei 107, 108
pacificus 107, 109
ragusæ 107
singularis.....107, 108
Homachthes 81
Homophylax *Banks*.....255
flavipennis *Banks*....255
Hopliphora 67
Hoplitis 76
Hoplopasites 82
Hoplosmia..... 75
Hybosciara 277
Hydrœcia.....1, 12, 47
albilunata *Smith* 12, 14
angelica *Smith*.....14, 40
appasionata 14, 44
atlantica *Smith*.....13, 18
cataphracta 14, 41
cerina ... .13, 27
cerussata.....14, 38
circumlucens *Smith* ...14, 43
erepta 47
frigida *Smith* 14, 39
furcata *Smith* 14, 46
harrisii 13, 30
immanis 13, 21
impecuniosa.....14, 42
inguæsita 13, 28
interoceanica *Smith* ...12, 17
juvenalis..... .....13, 20
limpida 14, 37
marginidens 14, 45
medialis 13, 24

PAGE

Hydræcia necopina 14, 36
nelita 14, 35
nitela 13, 34
obliqua 13, 23
pacifica *Smith* 13, 19
pallescens *Smith* 13, 25
purpurifascia 13, 33
rigida 13, 30
rutila 14, 43
senilis 13, 25
serrata 13, 26
speciosissima 13, 29
stramentosa 13, 22
u-album 12, 15
unimoda 14, 39
velata 12, 16
verona *Smith* 13, 32
Hydropsyche grandis *Banks* 258
occidentalis *Banks* ... 258
Hylæoides 96
Hylœosoma 86
Hypochrotœmia 80
Ischnothrix 292
Isogenus 241
Isopteryx 241
Janthinosoma 280
Koptorthosoma 71
Lachnocera 290
Lagobata 60
Lamprocolletes 94
Lasioptera 273
Lasisoma 275
Lathridiidæ 101
Lathridiini 106, 112, 185
Lathridius 113, 116, 185
armatulus *Fall* 116, 118
breviclavus *Fall* ... 116, 117
costicollis 117, 118
lardarius 116, 117
liratus 117, 119
montanus *Fall* 117, 118
productus 116, 117
Lecteria 291
Leia 276
Leiopodus 66
Leioproctus 95
Leptocella minuta *Banks* 257
Leptophlebia 247
basalis *Banks* 248

PAGE

Leptophlebini 246
Leptophylax *Banks* 252
gracilis *Banks* 252
Lestis 71
Lestremia 274
Leucochrysa mexicana *Banks* 251
Leuctra 242
Limnobia 288
Limnophila 292
Limnophilus americanus *Banks* 253
consimilus *Banks* 253
Liogaster 67
Liphanthus 88
Lipotriches 68
Liturgus 77
Lobogaster 297
Loxaulus spicatus *Bassett* 329
Lucasius 92
Lymnastis 235
Macrocera 274
Macromastix 286
Macropis 83
Macrotera 85
Macroteropsis *Ashmead* 85
Madrosoma 94
Manota 276
Megachile 77
Megachilidæ 55, 71
Megachilinæ 72, 76
Megalilissa 94
Megaloptera 92
Megalosmia 76
Megarrhina 279
Megistocera 285
Melanempis 81
Melanophthalma 106, 107, 145, 188
aculifera *Fall* . 169, 175
alberta *Fall* . . 170, 179
americana . . . 170, 180
casta *Fall* 169, 172
cavicollis 171, 181
chamæropis *F.* . 169, 171
distinguenda . . 169, 174
floridana *Fall* 169, 175
gibbosa 170, 176
incompta *Fall* 170, 177
insularis *Fall* . . 169, 174
longipennis . . 170, 179
picta 169, 171

PAGE
Melanophthalma pumila.....169, 175
regularis.....170, 178
similata.....170, 177
simplex.....169, 173
tenella.....171, 182
terricula *Fall* 170, 178
transversalis....170
villosa.....173, 190
Melanosmia..... 75
Melanostelis..... 79
Melecta..... 66
Melectoides..... 67
Melipona..... 57
Meliponinæ..... 56
Melissa..... 67
Melissodes..... 62, 63
Melissoptila..... 62
Melitoma..... 62
Melitta..... 89
Melittoxena..... 82
Meliturga..... 62
Meliturgopsis *Ashmead*..... 62
Mellitidea..... 91
Meroglossa..... 96
Merophysiini.....106, 184
Mesocheira..... 67
Mesonychium..... 67
Mesotrichia..... 71
Metangela.....278
Metophthalmus.....113, 114, 185
albosignatus *F.*.114, 115
americanus...114, 115
parviceps.....114
rudis *Fall*.....114, 115
trux *Fall*.....114, 115
Miastor.....274
Micrandrena *Ashmead*..... 89
Monia..... 88
Monœca..... 61
Monogoma.....291
Monumetha..... 74
Morgania..... 81
Mycetobia.....274
Mycetophila.....277
Nemocera anomala.....274
vera.....273
Nemoura.....242
stigmata *Banks*.....244
Neocempheria.....275
PAGE
Neoglaphyroptera.....276
Neolarra..... 81
Neopasites..... 81
Neoperdita..... 85
Nephrotoma.....287
Neuropteroid Insects.....239
Neuroterus consimilis *Bassett*.....335
Neuroterus distortus *Bassett*.....336
dubia *Bassett*.....335
exiguissimus *Bassett*...332
exiguus *Bassett*.....333
fragilis *Bassett*.....335
Gillettei *Bassett*.....334
perminimus *Bassett*....332
tectus *Bassett*.....331
umbilicatus *Bassett*....330
Noctuidæ of Boreal America..... 1
Nomada..... 69
Nomadita..... 82
Nomadopsis..... 84
Nomia..... 88
Nomiodes..... 92
Notidobia americana *Banks*.....256
Nothosmia *Ashmead*..... 75
Ochlerotatus.....280
Œcetina guttata *Banks*.....257
Ediscelis..... 80
Estropsis..... 89
Orthocladius.....283
Orthorrhapha.....273
Osiris..... 68
Osmia..... 75
Oxæa..... 71
Oxystoglossa..... 91
Ozodicera.....285
Pachyrrhina.....287
Palostoma.....297
Panorpa signifer *Banks*.....251
Panurginus..... 85
Panurgus..... 85
Papaipema.....12, 48
Paracolletes..... 91
Paradioxys..... 82
Paramegilla..... 60
Parandrena..... 83
Paranomia..... 88
Parasphecodes..... 91
Paratropesa.....290
Parevaspis..... 80

PAGE

Pasiphæ 95
Pasites 81
Pentagenia 247
Pentanenra 282
Penthera 297
Penthetria 297
Penthoptera 293
Perdita 85
Perditella 84
Perditomorpha *Ashmead* 86
Pericoma 285
Peripheroptera 288
Perla 241
americana *Banks* 243
sabulosa *Banks* 242
Perlinella *Banks* 241, 242
Phiarus 81
Phileremulus 81
Phileremus 81
Philopotamus barrettæ *Banks* 259
Philoxanthus 84
Phthinia 276
Platynopoda 71
Platynra 274
Plecia 296
Plesiastina 274
Podalarius 60
Podonomus 283
Pœcilostola 292
Polycentropus variegatus *Banks* 259
Polyderis 236
glabrella 237
testacelimbata 237
Polymera 292
Polymoria 290
Potamorites virginica *Banks* 256
Potamyia *Banks* 259
Pristotrichia 90
Probolæus 276
Prosopis 96
Protandrena 88
Protostelis 79
Psænythia 88
Pseudomelecta 66
Pseudopanurgus 85
Pseudopheolus 80
Pseudoperla 241
Pseudosciara 277
Pseudosmia 75

PAGE

Psithyrus 58
Psocus barretti *Banks* 239
oregonus *Banks* 239
virginianus *Banks* 239
Psophora 279
Psychoda 284
Psychophæna 282
Pteronarcella *Banks* 241, 242
Pteronarcys 241
Ptiloglossa 89
Ptilogyna 285
Ptychoptera 293
Pyrrhomelectra *Ashmead* 66
Revelieria 113, 143, 187
californica *Full* 144
Rhamphida 289
Rhathymus 67
Rhipidia 288
Rhophites 83
Rhophitoides 83
Rhyacophila mexicana *Banks* 259
Rhynochosciara 277
Rhyphus 298
Sabethes 281
Sackeniella 298
Saropoda 59
Scatopse 294
Schmiedeknechtia 81
Sciara 277
Sciophila 275
Scrapter 84
Scrapteroides 85
Serapis 78
Shoruherria 71
Sigmatomera 291
Simulium 297
Siphlurus 247
Spaniotoma 282
Sphecodes 93
Sphecodogaster *Ashmead* 92
Sphecophala 89
Spinoliella *Ashmead* 84
Steganomus 77
Stelidomorpha 80
Stelis 80
Stenophylax antennatus *Banks* 254
pacificus *Banks* 254
Stenotritus 90
Stilpnosoma 96

PAGE

Symplecta 291
Synhalonia 61, 63
Systropha 90
Tachylopha 235
Tachymenis..... 236
marginicollis ... .236
reflexicollis 237
Tachys 191, 233, 235
æneipennis 236
ænescens... .....196, 197
albipes.....225, 226
anthrax.....203, 207
audax 202, 206
bradycellinus *Hayward* 219, 224
capax 203, 209
columbiensis *Hayward* 226, 231
corax 219, 222
corruscus ... .226, 231
dolosus 202, 205
edax.....226, 230
ephippiatus.....196, 213, 214
falli *Hayward* 198, 199
ferrugineus 203, 211
flavicauda.....196, 200
frontalis *Hayward* 196, 212
fuscicornis 202, 204
granarius 202, 203
incurvus....196, 201, 202, 204
lactulus 214, 215
lævus... ...196, 215, 216, 217
latipennis *Hayward* ...226, 227
liebecki *Hayward* 203, 207
misellus.....219, 223
mordax..... 219
nanus 196, 197, 198
nebulosus 203, 207
obesulus 203, 210
occultator 219, 221
pallidus.....219, 220
proximus....197, 221, 226, 228
pumilus.....226, 230
rapax..... ... .202, 205
rufotestaceus *Hayward* 216, 217
scitulus 226, 229
sellatus 213, 214
sequax 232
trechiformis *Hayward*.....216
tripunctatus.....202, 210
ventricosus.....226, 227

PAGE

Tachys virgo 219, 220
vittiger.....196, 218, 219, 222
vivax 203, 209
vorax.....226, 229
xanthopus 202, 208
Tachyura 235
brunnicollis 236
Tæniopteryx 241
occidentalis *Banks* ..244
pacifica *Banks* 244
Tæniorhynchus 280
Tanyderus 293
Tanypus 283
Telmatogeu 282
Temnosoma 93
Tetragona 57
Tetragoneura 276
Tetralonia 61
Tetraloniella *Ashmead* 61
Tetrapædia 64
Tetraphora.....282
Teucholabis 290
Thalestria 66
Thaumatosoma 77
Tipula 286
Toxorrhina 289
Trachusa 73
Triænodes borealis *Banks*.....257, 258
flavescens *Banks*...257, 258
grisea 258
Triænodes ignita . .. .258
Trichochstoma 91
Trichoptera... 252
Trichopteromyia 274
Trichosia 278
Tridentosmia 76
Trigona..... 57
Trimicra.....291
Trophocleptria 67
Trypetes 73
Uranotænia.....281
Winnertzia.....273
Xenoglossa 61, 63
Xenoglossodes *Ashmead* 63
Xylocopa 71
Zacesta *Ashmead* 73
Zacosmia 65
Zadontomerus *Ashmead* 69
Zygoneura 278

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